External Adjustment and U.S. Macroeconomic Performance

It is generally accepted that the U.S. current account deficit poses risks to the economy and that its reduction is one of this nation's important policy goals. How the process of external adjustment will affect future U.S. economic performance is, however, less clearly understood. Although many observers contend that adjustment may require temporarily slower growth in U.S. living standards, the extent of this and other economic costs of reducing the current account deficit has not been fully examined.

In this article, we seek to analyze the macroeconomic implications of U.S. external adjustment. To this end, we develop a simulation model of the U.S. economy that allows us to identify alternative adjustment scenarios differing in their projections for future policy actions and market behavior. These scenarios are assessed according to their effectiveness in achieving a sustained reduction in the U.S. current account deficit and other important macroeconomic objectives.

In the course of the analysis, we point to certain specific changes in economic activity that will be required along any path that reduces the U.S. current account deficit. In particular, the virtual elimination of the U.S. merchandise trade deficit, a slowing in domestic demand, and a significant rise in the national savings rate will all be necessary if adjustment is to take place without fueling inflationary pressures or eroding long-term growth prospects in the United States.

We also find that measures increasing world demand for U.S. goods cannot be expected, by themselves, to provide the major impetus for adjustment. After several years of rapid growth, the U.S. economy is approaching full capacity. Consequently, further reductions in the dollar's real value or steps to stimulate foreign demand growth will likely produce only limited improvement in the current account unless they are accompanied by economic changes that slow the pace of demand in the United States.

These results are supported by our empirical analysis. The examination of alternative adjustment scenarios reveals that the failure to take timely actions to reduce the current account deficit poses risks to the U.S. economy. In particular, external adjustment brought about by financial market reactions in the absence of active policy measures could lead to a serious disruption in U.S. and global economic activity. Even without such reactions, postponing the adjustment process into the 1990s will almost certainly lead to a greater cumulative slowdown in real GNP and domestic demand than would occur if adjustment were to begin immediately.

In contrast, appropriate and timely policy actions taken by fiscal and monetary authorities can generate an adjustment path consistent with overall macroeconomic stability. Under a scenario in which fiscal policy contracts and monetary authorities respond accordingly, U.S. output can grow at close to its full capacity rate of between 2½ and 3 percent annually while domestic demand expands at a rate that is one-half of one percentage point less than that of GNP. These rates of expansion require a slowing from recent trends, particularly for demand, but represent paths of maximum sustainable growth consistent with both external adjustment and price stability.

Our analysis further suggests that foreign economic

conditions play an important role in determining the trade-offs facing the U.S. economy. Faster foreign domestic demand growth would allow for more rapid U.S. growth during adjustment. Moreover, under the scenario described above in which domestic policies allow for adjustment with output growth near full capacity, a temporary stimulus to foreign demand, coordinated with U.S. actions, could reduce the magnitude of U.S. policy changes required to reduce the current account deficit.

Conceptual discussion

The U.S. external deficit can be reduced in a variety of ways, and the specific factors inducing adjustment will play a key role in determining the path of economic activity. Nonetheless, there are constraints common to all nations undergoing external adjustment that, when viewed in the light of recent U.S. experience, allow us to identify changes in activity that will be necessary along almost any adjustment path.

In considering these changes, it is useful to recall three identities that describe a current account imbalance.[1] First, a nation's current account deficit, CAD, reflects an imbalance in its overall trade position with other nations. As identity 1 shows, an external imbalance can be decomposed into the sum of the trade deficit — representing the gap between imports, M, and exports, X, of goods and services — and the net investment incomes deficit, IIP, which accounts for returns to foreigners on their net holdings of U.S. assets. Similarly, a current account deficit reflects an excess of national spending on goods and services, DD, over GNP (identity 2). This gap between spending and output must be bridged by net borrowing from abroad, meaning that national savings — net private savings, S^P, plus net savings of the public sector, S^g — is insufficient to satisfy the domestic demand for these savings in the form of investment, I (identity 3).

(1) $CAD = (M - X) + IIP$
(2) $CAD = DD - GNP$
(3) $CAD = I - (S^P + S^g)$

These identities highlight conditions necessary to reduce a current account deficit. Imports (or net investment income payments) must slow relative to exports at the same time that domestic demand slows in relation to output and national savings rises relative to investment. These identities cannot, of course, determine the path of any particular variable over the adjustment period. Exports, output, and savings could all conceivably rise or fall, allowing for a similar variation in the path of their counterparts in the identities presented above.

However, an analysis of recent U.S. experience indicates changes in these identities that will likely take place during adjustment. In particular, the large and growing U.S. debt to foreign countries has clear-cut implications for the pattern of trade adjustment. The U.S. net foreign asset position, representing loans, securities, and direct investment claims, has fallen sharply during this decade, and our net foreign debt, according to official estimates, is now approaching $500 billion (Table 1). This accumulation of debt has been accompanied by a rising stream of interest and dividend payments abroad, reflected in the decline of more than $25 billion in the net investment income balance since 1980.

The continued deterioration of the investment income balance is inevitable, particularly in an environment in which the current account is likely to move only gradually toward balance. Indeed, at current rates of return

[1] In presenting the identities, we ignore the role of unilateral transfers and do not account for differences in measures of the U.S. external account on a Balance of Payments basis and on a National Income and Product Accounts basis.

Table 1

Breakdown of U.S. Current Account Balance

(Billions of Dollars)

	1980	1983	1985	1987	1988
Current account balance	1.8	−46.3	−115.1	−154.0	−135.3
Merchandise trade balance	−25.5	−67.1	−122.1	−160.3	−126.5
Net investment income	30.4	24.9	25.9	20.4	2.6
Transfers and other services	−3.0	−4.0	−18.9	−14.1	−11.4
Memo: U.S. net foreign asset position					
Level	106.3	89.4	−110.7	−368.2	−487.1
Share of GNP	3.9	2.6	−2.8	−8.1	−9.9

Source: Department of Commerce

the U.S. factor income balance will almost certainly move into deficit in the coming years.[2] As a result, the external adjustment burden will be placed entirely on the "primary" trade balance — the merchandise trade balance plus net transfers and other nonfactor services. More specifically, it is likely that the U.S. merchandise trade balance, which has been in deficit since 1975, will need to be balanced eventually, simply to stabilize the current account deficit in relation to GNP.

The necessary adjustment in the U.S. trade position represents, at the macroeconomic level, a large transfer of real resources to foreign countries. The pattern of production in the United States must be shifted away from satisfying domestic needs and towards the export sector. Consequently, the adjustment process will limit the growth of domestic purchases of goods and services. As identity 2 indicates, real domestic demand growth is determined by two factors during the adjustment process — the growth path of output (GNP) and the initial size of the external imbalance, reflected by the gap between demand and output.

Most recent studies that have examined U.S. growth performance suggest that the economy's real potential growth rate — the maximum rate at which growth can be sustained while maintaining stable rates of inflation — currently stands between 2.5 percent and 3 percent annually.[3] Using this as a target for output growth allows us to determine the noninflationary growth rate of domestic demand that is consistent with eliminating the current account deficit. For example, if the U.S. economy were to sustain real GNP growth at the rate of 2¾ percent per year over the next five years, domestic demand growth could grow at most by 2¼ percent annually — one-half of one percentage point slower than GNP — in order to eliminate the U.S. current account deficit during this period.[4]

Domestic demand could, of course, grow more rapidly during the adjustment period if excess capacity existed in the economy. Indeed, this appears to have been the case in the United States since the beginning of 1986 (Table 2). Over the past three years, the current account deficit has declined despite the continued growth in domestic demand at or above the U.S. potential growth rate. This improvement has been made pos-

[2]Estimates based on our simulation model suggest that at current interest rates and net debt levels, the U.S. investment income balance will move into deficit by 1990 and steadily deteriorate through the first half of the next decade, even in an environment of declining current account deficits.

[3]Potential growth is usually determined by identifying growth in an economy's productive resources together with the rate of advance in their productivity. See, for example, the following recent studies: "Potential Output in the Major Industrial Countries," Staff Studies for the World Economic Outlook, International Monetary Fund, August, 1987; Robert J. Gordon, "Unemployment and Potential Output in the 1980s," Brookings Papers on Economic Activity 2: 1984; and Douglas W. Woodham, "Potential Output Growth and the Long-Term Inflation Outlook," this *Quarterly Review,* vol. 9 (Summer 1984).

[4]In real terms the current account deficit represented roughly 2½ percent of GNP in 1988. To appreciate how the size of our initial external imbalance affects the ability of demand to expand, note that if the current account deficit were half its current size (1¼ percent of GNP), domestic demand could expand at 2½ percent per year over the next five years while achieving external adjustment.

Table 2

Recent Trends in U.S. Economic Activity

	1982-I to 1985-IV	1986-I to 1988-IV
GNP growth (annualized percent change)	3.3	3.2
Domestic demand (annualized percent change)	4.5	2.9
Foreign domestic demand (annualized percent change)†	2.3	4.3
Real effective exchange rate (annualized percent change)‡	2.4	−8.8
Current account as a share of GNP		
Level (end of period)	−3.1	−2.5
Change over period (percentage points)	−3.2	0.6
Capacity utilization rate		
Level (end of period)	80.3	84.2
Change over period (percentage points)	2.9	3.9
Unemployment rate		
Level (end of period)	7.1	5.3
Change over period (percentage points)	−1.1	−1.8

†Weighted average of domesic demand growth in Canada, France, Italy, Japan, the United Kingdom, and West Germany.
‡Real trade-weighted value of the dollar against 14 industrial countries, computed using dollar exchange rates deflated by the ratio of foreign to U.S. wholesale prices.

sible by drawing on underutilized resources in the economy. Factor utilization rates have increased steadily since 1981, allowing GNP to expand above its full capacity growth rate of 2½ to 3 percent.

Capacity utilization rates and unemployment rates have, however, reached levels suggesting that attempts to sustain current growth rates will likely fuel inflationary pressures.[5] Thus, even if full employment growth is maintained, a substantial slowing in domestic demand, relative to both its recent trend and output growth, appears necessary if the economy is to follow an adjustment path that does not lead to an acceleration in inflation.

An examination of recent trends in U.S. savings and investment balances provides further insight into the likely nature of the adjustment process (Table 3). These balances, presented as a share of GNP, indicate the importance of a decline in the national savings rate in the deterioration of the U.S. external balance since 1980. Over the course of this decade, net national savings as a share of GNP has fallen sharply from 5.1 percent in 1980 to 2.8 percent in 1988.[6] (This rate is currently less than half that of any other major industrial nation.[7]) As a result, net investment demand has been increasingly financed from abroad, with foreign sources accounting for at least half of U.S. net investment in each of the past three years.

[5]For a detailed analysis of capacity constraints in the U.S. manufacturing sector, see Spence Hilton, "Capacity Constraints and the Prospects for External Adjustment and Economic Growth: 1989-90," in this issue of the *Quarterly Review*.

[6]It is clear from Table 3 that much of the deterioration of national savings between 1980 and 1986 was attributable to public sector borrowing that more than doubled as a share of GNP. Since 1986 net national savings has risen as a decline in private savings has been more than offset by an increase in public savings.

[7]The latest available OECD measures for 1987 indicate that net national savings as a share of GDP were as follows: Japan 18.4, Germany 11.4, France 7.0, the United Kingdom 5.4, Italy 10.0, Canada 7.2, and the United States 2.4.

While external adjustment could, in principle, involve changes in either investment or savings rates, it is difficult to conceive of a viable adjustment path in which the net national savings rate remained at its present level. Eliminating the U.S. current account deficit while maintaining this savings rate would imply a sharp reduction in net investment as a share of GNP and, consequently, a slowing in the economy's capacity for growth.[8] Thus, if adjustment is to occur without eroding long-term prospects for growth, it must be accompanied by a significant increase in national savings.

Adjustment and policy actions

The preceding discussion suggests that three changes in economic activity will characterize any adjustment scenario consistent with stable inflation and unchanged capacity growth rates. First, in order to achieve external adjustment, the U.S. trade deficit will need to be virtually eliminated to offset the likely increase in debt service payments in the coming years. Second, domestic demand growth — meaning some combination of private consumption, government spending, and investment — will have to slow from its pace of recent years. Annual GNP growth of between 2½ and 3 percent (perhaps more safely estimated at 2½ percent) and domestic demand growth roughly one-half of one percentage point less than GNP represent reasonable standards for U.S. performance if external adjustment is to be realized without placing upward pressure on inflation. Finally, adjustment must be accompanied by a substantial increase in net national savings as a share of output to prevent a deterioration of U.S. growth prospects over the long term.

[8]In particular, a decline in the net investment rate to below 3 percent (the current net savings rate) could lower the rate of capital accumulation by as much as 1½ percent per year. The studies of U.S. productive capacity cited earlier would indicate that this slowdown in capital accumulation could reduce potential growth rates and, ultimately, U.S. living standards by three-tenths of one percentage point to five-tenths of one percentage point annually.

Table 3

U.S. Savings and Investment Balances

(As a Percent of GNP)

	1980	1984	1986	1987	1988e
Net investment	5.0	6.9	5.2	5.2	5.6
Net national savings	5.1	4.1	1.9	1.8	2.8
Private	6.4	6.8	5.3	4.1	4.7
Public	−1.3	−2.8	−3.4	−2.3	−1.8
Current account balance	0.1	−2.8	−3.3	−3.4	−2.8

Source: Bureau of Economic Analysis

These changes, which might be viewed as "necessary conditions" for adjustment, limit the alternative adjustment paths available. Nonetheless, the preceding analysis is not sufficient to determine the effects or extent of adjustment on key macroeconomic variables. Shifts in policies (either here or abroad) as well as changes in behavior unrelated to policy could move the current account toward balance. The actual path that the economy follows will depend on the factors underlying the adjustment process.

We have seen, for example, that the economy's potential growth rate plays an important role in determining the maximum rates of expansion in demand and output consistent with adjustment and nonaccelerating inflation. Many observers, however, have argued that as a result of measures necessary to bring about the changes described above, the economy will be unable to sustain full employment growth while undergoing adjustment and will suffer other economic disruptions. The evidence of other industrial nations seems to provide support for this view (Table 4). Over the past fifteen years, industrial nations have generally experienced a slowdown in output and demand growth from long-term trends in the process of reducing large external deficits.

Table 4 also illustrates the variation in the growth experiences of other nations. For example, growth slowed quite considerably in Germany in the course of deficit reduction, but not at all in Canada. In recent U.S. experience, we have seen (Table 2) that the current account deficit was reduced from 1986 onward while demand and output growth proceeded along or above long-term trends. This performance, largely attributable to the dollar's decline and increased foreign expenditure growth, might suggest that the external imbalance could be alleviated by measures that raise world demand for U.S. goods.

However, the gains that can be realized solely through a foreign demand stimulus or dollar depreciation are likely to be limited. While these measures tend to improve the U.S. external deficit, primarily through increased export demand, they also raise total demand for U.S. domestic output. As we have seen, this mechanism can bring about adjustment while reducing the gap between actual and potential output as long as the economy is below full employment. As capacity constraints are approached, however, continued reliance on measures to increase demand for U.S. goods will likely reap diminishing improvements in the current account and instead fuel near-term inflationary pressures.

This analysis does not exclude a role for exchange rate depreciation or stimulative foreign demand policies. As we will see later, these measures may play an important complementary role in the adjustment process. Nevertheless, in an economy operating near full capacity, measures that serve to slow domestic demand growth will be central to the adjustment process.

There are, however, significant risks in promoting adjustment by acting to slow demand. Contractions in demand, whether due to market forces or policy actions, exert strong downward pressure on overall levels of economic activity. The effects on output growth from a negative demand shock may be particularly sizable in the case of the United States, because a slowdown in the pace of domestic demand growth in the world's largest economy is likely to have a powerful effect on activity abroad.

A prolonged downward shift in activity may also have damaging effects through its impact on the composition of demand. Since investment is the component of demand most sensitive to fluctuations in output, a persistent slowing in activity growth could lower the rate of

Table 4

External Adjustment and Rates of Activity Growth in Other Industrial Countries

(Average Annual Percent Change)

	Adjustment Period	Change in Current Account As a Share of GNP (In Percentage Points)	GNP		Domestic Demand	
			Adjustment Period	Trend†	Adjustment Period	Trend†
United Kingdom	1974-78	4.6	1.2	1.7	0.4	1.6
Germany	1980-82	2.5	0.2	1.8	−1.2	1.7
France	1982-85	2.1	1.5	2.2	1.3	2.0
Canada	1975-80	2.3	3.7	3.4	3.4	3.5
Italy	1980-83	2.6	1.6	2.4	1.5	2.3

†Trend period is 1974 to 1987.

capital accumulation and underlying growth capacity. At the same time, the government budget deficit generally rises in an economic downturn, a development that could exacerbate already significant budgetary problems. Thus, the concern raised earlier, that adjustment will result from slowing investment with little or no changes forthcoming in national savings, is not unwarranted. Evidence of the potential significance of this concern is provided in Table 5. In other industrial economies, current account adjustment has been almost uniformly accompanied by declining government budget balances and sharp reductions in net private investment rates.

Domestic policy makers do have some control over the composition of demand during adjustment. It may be possible, for example, to reduce a current account deficit by combining a fiscal contraction to slow demand (and raise national savings) with monetary policy actions that allow real interest rates to decline in order to promote investment demand. However, the net impact of any such policy actions that promote external adjustment must clearly be to reduce domestic demand growth. Thus, to the extent that exchange rates and foreign demand growth are left unchanged, domestic policy makers may be faced with a basic conflict between their goals of maintaining full employment and reducing external imbalances.

These considerations suggest that a coordination of domestic and foreign policies may prove beneficial to the adjustment process. Coordination may not require active measures by policy makers abroad since the dollar's real value would tend to fall as a result of a slowing in U.S. demand growth and a decline in real interest rates. Nonetheless, an agreement to allow some dollar depreciation and/or foreign demand stimulus to offset a contraction to domestic demand in the United States may help maintain the level of economic activity here and abroad and improve the trade-offs facing U.S. policy makers.

Analysis of possible adjustment paths

We now turn from our general discussion to a more detailed analysis of potential external adjustment paths. To this end, we have developed a model incorporating the main determinants of U.S. macroeconomic performance and its external balance that allows us to compare a number of alternative adjustment scenarios.

By projecting the path of key behavioral and policy parameters into the future, we simulate a "baseline" scenario for U.S. economic performance over 1989-97. Under this scenario the current account deficit increases from 1990 onward, reaching 3½ percent of GNP in 1993 and 3¾ percent by 1997. We then consider three alternative scenarios that would allow the

Table 5

External Adjustment and Shifts in Composition of Demand in Other Industrial Countries

(Shares of GNP)

	Current Account	Net National Saving	Budget Deficit	Net Private Investment
United Kingdom				
1974	−4.0	5.1	−3.8	9.1
1978	0.6	7.9	−4.4	7.3
Change (percentage points)	4.6	2.8	−0.6	−1.8
Germany				
1980	−1.7	10.1	−2.9	11.8
1982	0.8	7.7	−3.3	6.9
Change (percentage points)	2.5	−2.4	−0.4	−4.9
France				
1982	−2.2	7.3	−2.8	9.5
1985	−0.1	7.1	−2.8	7.2
Change (percentage points)	2.1	−0.2	0.0	−2.3
Canada				
1975	−2.7	11.3	−2.5	14.0
1980	−0.4	11.4	−2.8	11.8
Change (percentage points)	2.3	0.1	−0.3	−2.2
Italy				
1980	−2.2	14.1	−8.5	16.3
1983	0.4	11.0	−10.7	10.6
Change (percentage points)	2.6	−3.1	−2.2	−5.7

Source: OECD, Department of Economics and Statistics, *National Accounts*, vol. 2.

United States to reduce its current account deficit to 1 percent of GNP by 1993. These scenarios describe adjustment under the following conditions: (1) market-induced changes in interest rates and the real value of the dollar arising from shifts in expectations about the dollar's long-run value or from increased risk premia on U.S. assets, (2) U.S. fiscal and monetary policy actions under unchanged market conditions, and (3) U.S. policy measures coordinated with the actions of foreign authorities.

The alternatives to our baseline scenario are evaluated according to their ability to achieve external adjustment concurrently with three broad macroeconomic objectives: the avoidance of upward pressure on the rate of inflation;[9] full employment (sustaining output at or close to potential); and the maintenance of the economy's long-term growth prospects (adequate investment growth). Furthermore, we evaluate economic performance under each scenario through 1997 in order to consider the sustainability of external adjustment and its implications for activity beyond the adjustment horizon.

The model

The model used in the simulations (described in detail in the Appendix) has been designed to capture in a simple way key macroeconomic trade-offs associated with adjustment. We account for the major determinants of economic activity and the current account balance in the United States, focusing on the medium-term dynamics embodied in these relations.

In our model, output is determined by the level of aggregate demand. Thus, any shock to demand will have a direct and immediate impact on the pace of GNP growth. The domestic component of demand consists of relations for private consumption, private investment, and government consumption. The private components of demand are related to levels of activity, the interest rate, and private sector wealth. Government spending, including federal, state, and local authority expenditure, is an exogenously determined policy instrument, modeled as a share of potential GNP.

The specification of the external component of demand consists of standard volume and price equations for exports and imports of goods and services. Net investment income payments are modeled separately by applying a rate of return (calculated as an average of past values of the U.S. nominal interest rate) to the economy's net foreign asset position. The current account balance reflects the sum of the balances on net exports of goods and services and net investment incomes. Changes in the net foreign asset position of the economy are determined, in turn, by the current account balance.

Although output is demand-determined, supply considerations play an important role in this model through their impact on inflation, interest rates, and private disposable income. The economy's full capacity level of output is based on a production function incorporating the capital stock (determined by past investment trends), estimates of the underlying growth of the labor force, and total factor productivity growth. The gap between actual output and this measure of full capacity is the principal determinant of domestic inflation. In addition, net government tax receipts are related to the output gap, serving to dampen movements in household income over the business cycle.

The nominal interest rate, modeled as an average of short- and long-term yields, is assumed to be a policy instrument of the monetary authorities. Authorities are also assumed to know the inflation process and to adjust the nominal interest rate in line with changes in inflationary expectations, thus neutralizing the impact of inflation on the real interest rate.

The real exchange rate (terms of trade) is determined by assuming (1) that there is perfect capital mobility internationally such that the expected rate of real dollar depreciation equals the U.S.-foreign real interest differential adjusted for risk (covered interest parity); and (2) that the real value of the dollar is expected to return to its equilibrium level (assumed unchanged) at a constant rate. The path of the nominal exchange rate is determined by the real exchange rate and the U.S.-foreign inflation differential. Although exchange rates are determined within the model, other foreign variables — foreign demand growth, prices, and interest rates — follow exogenously determined paths.

It should be emphasized that the results generated by the model are sensitive to both its general structure and the specific parameter values it embodies. Consequently, while precise numerical paths for economic variables are presented, these results must be interpreted only as a general representation of how the economy would respond. Nevertheless, our experiments suggest that the qualitative nature of the results are robust with regard to small changes in the model parameterization. Thus, to the extent that the model reasonably represents the functioning of the economy, our analysis does provide a relevant basis for evaluating the adjustment alternatives and policy trade-offs facing the U.S. economy.

The baseline scenario

The baseline simulation combines the model described above with projections for key (exogenous)

[9]This criterion does not imply that maintaining inflation at its current rate is itself a desirable policy goal.

economic conditions from 1989 to 1997.[10] In particular, we project that foreign domestic demand and foreign prices will grow by 3.25 and 3.5 percent per year respectively. U.S. and foreign real interest rates are assumed to be held constant at 3.5 and 2.8 percent respectively but are equal on a risk-adjusted basis (there is a risk premium of 70 basis points on U.S. assets). Thus, these assumptions are consistent with a stable real exchange rate over the forecast horizon.

These projections, which apply to all other scenarios unless otherwise stated, should not be viewed as a forecast of actual future outcomes. Instead, they illustrate one possible path that economic activity might follow if current trends were extended into the future.

The outcome of the baseline scenario is summarized in Table 6 and Chart 1. We project an acceleration in domestic demand growth in 1989 and 1990 attributable to the lagged effects of rapid GNP growth. Combined with a slowdown in foreign domestic demand growth from its earlier pace and a stable real value of the dollar, this acceleration leads to a deterioration in the U.S. current account that, over time, slows economic growth. On average, domestic demand grows by 2.6 percent over 1989-93 and 2.5 percent during 1994-97; GNP grows by 2.5 percent and 2.4 percent per year during these periods. The current account deficit increases to roughly $250 billion by 1993 and reaches 3.8 percent of GNP at the end of the projection period.

The significance of rising debt service payments in these projections should be noted. Net investment income payments rise by 1.6 percent relative to GNP from 1989 to 1997 and account for all of the deterioration in the current account over this period. This deterioration can be attributed to the rise in U.S. net foreign debt (which nearly triples in relation to GNP during this period), along with the increase in the nominal interest

[10]Historical values are used for all variables through 1987. The model's output for 1988 incorporates actual values, estimates, and model-generated projections.

Table 6

The Baseline Simulation 1988-97

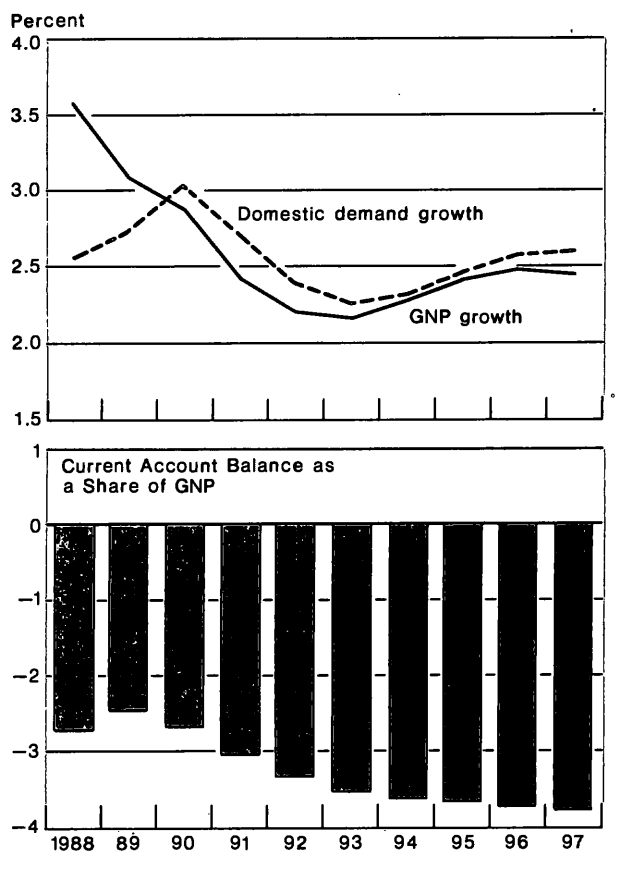
(Average Annual Percent Change)

	1988	1989-93	1994-97
GNP	3.6	2.5	2.4
Domestic demand	2.6	2.6	2.5
Private consumption	2.5	2.6	2.5
Government consumption	0.2	2.6	2.7
Investment	5.5	2.7	2.4
Prices (GNP deflator)	4.6	6.1	5.2
Real exchange rate†	0.0	0.0	0.0
	1988	**1993**	**1997**
Current account balance			
In billions of dollars	−131.0	−260.0	−377.0
As a percent of GNP	−2.7	−3.5	−3.8
Net investment income (as a percent of GNP)	−0.2	−1.2	−1.8
Primary trade balance (as a percent of GNP)	−2.5	−2.3	−2.0
Government budget balance (as a percent of GNP)	−1.8	−2.1	−1.9
Potential output	2.7	2.7	2.6
Nominal interest rate (level)	6.8	9.8	8.4
Real interest rate (level)	3.5	3.5	3.5
Net foreign assets (as a percent of GNP)	−9.9	−18.1	−26.0

†(+) signifies depreciation.

Chart 1

The Baseline Simulation



rate associated with a pickup in inflation.

Scenarios leading to current account adjustment

The baseline scenario traces one possible path of economic activity into the future. A principal implication of this scenario is that external adjustment will end in 1989 and the U.S. current account deficit will steadily rise during the 1990s.

As an alternative to the baseline, we now examine other scenarios that lead to a substantial reduction in the current account deficit during the next five years. Specifically, we consider alternative paths in which the U.S. current account deficit is reduced to 1 percent of GNP by 1993. This criterion, while imposing rigid and somewhat arbitrary terms on the magnitude and timing of external adjustment, enables us to examine the implications of a significant medium-term improvement in the U.S. current account balance. Such an improvement would bring the current account deficit to a level that will likely be sustainable in an environment of roughly balanced trade flows (excluding debt service payments).[11]

Market-induced adjustment

The baseline scenario assumes that the projected increase in U.S. external imbalances will not substantially alter interest rates or other financial market conditions. There is, however, considerable concern that in an environment of large and growing current account deficits, market-induced shocks will bring about external adjustment. Market-induced adjustment paths can arise from a number of factors, two of which we consider here. First, the deterioration of the current account projected in the baseline could lead to a downward revision in market expectations of the dollar's long-run real value. Given the high degree of financial market integration in the industrial world, such a revision would likely lower the dollar's value immediately, unless U.S. interest rates were to rise substantially relative to rates abroad.

Second, foreign investors might require a higher return on U.S. assets in order to absorb the increased supply of dollar-denominated debt that will likely accompany ongoing current account deficits. Conceptually, these higher returns might be necessary to compensate investors for the additional risk (arising primarily from possible fluctuations in the dollar's value) they bear in increasing the share of dollar-denominated assets in their portfolios.[12] Any increase in risk premia on dollar assets would likely result in some combination of a fall in the dollar's real value (at an unchanged long-run value) and an increase in the domestic real interest rate.

Changes in exchange rate expectations and/or risk premia could reduce the current account deficit through the combined effects of a real dollar depreciation that shifts world demand towards U.S. goods and an increase in the U.S. real interest rate that dampens domestic demand. It is difficult, however, to assess the potential magnitude of these exchange rate and interest rate effects. Available evidence regarding the determinants of exchange rate expectations and the importance of exchange rate risk in relative asset yields is inconclusive. Moreover, the real possibility of bandwagon effects or speculative bubbles arising from hard-to-predict investor psychology cannot be assessed in any systematic way. Thus, in our analysis we consider a range of possible combinations of dollar depreciation and increases in the U.S. real interest rate that are consistent with our adjustment criteria. This approach allows us to assess well-defined market-based adjustment scenarios, but it must be emphasized that these scenarios may not adequately represent the actual market response to the conditions embodied in the baseline projections.

Three possible market solutions that reduce the U.S. current account deficit to 1 percent of GNP by 1993 are presented in Table 7. In one case, market forces lower the real value of the dollar with only a small increase in the real interest rate. In another, market forces raise the U.S. real interest rate with only a mild decline in the real value of the dollar. Finally, a third scenario considers an adjustment path involving substantial changes in both the real value of the dollar and the real interest rate.

These scenarios highlight the significant potential risks to macroeconomic stability posed by a market-driven adjustment process. Although our current account target can be obtained largely through a fall in the real value of the dollar (a decline of nearly 13 percent cumulatively over 1989-93), this fall leads to an overheating of the economy. GNP grows by nearly 4 percent per year during the adjustment period, a rate far exceeding the economy's potential growth rate. As a result, inflationary pressures build rapidly, approaching a 9 percent rate by 1993 and rising above 11 percent in 1997.

More significantly, the analysis suggests that adjust-

[11]On the basis of the assumptions for capacity growth rates and real interest rates that underlie the baseline scenario, adjustment of the U.S. current account deficit to 1 percent of GNP is sustainable over the long run in an environment in which the U.S. runs a small surplus in its external balance excluding net payments on its foreign debt. For a more detailed exposition of the relationship between current account and trade balance sustainability, see Charles Pigott, "Economic Consequences of Continued U.S. External Deficits," in this issue of the *Quarterly Review*.

[12]These issues are addressed in considerably greater detail in Juann Hung, Charles Pigott, and Anthony Rodrigues, "Financial Implications of the U.S. External Deficit," in this issue of the *Quarterly Review*.

ment brought about by dollar depreciation alone is not sustainable. The increased pace of activity arising from the dollar's decline supports domestic demand growth well beyond the adjustment period. Domestic demand grows at an average rate of nearly 3 percent per year over 1994-97 under this scenario, roughly one-half of one percentage point above the rate projected in the baseline scenario. In addition, debt service payments rise sharply due to an acceleration in inflation that drives up the nominal interest rate to a level exceeding 16 percent in 1997. The combined effects of rapid demand growth and rising debt service completely reverse the earlier adjustment. The U.S. current account deficit increases by 1½ percent relative to GNP over the years 1994-97, and by 1997 the deficit has nearly returned to its 1988 share of GNP.

An adjustment process resulting from market-induced shocks that primarily raise the U.S. real interest rate presents a very different economic scenario. The substantial increase in the U.S. real interest rate (four percentage points above the baseline level) reduces the current account deficit at the cost of a sharp slowdown in domestic demand growth, to 1 percent per year over 1989-93.[13] As a result, GNP grows only 1.6 percent annually, a full percentage point slower than its pace in the baseline.

The impact of the rise in the real interest rate is transmitted primarily through investment demand. Investment contracts at an annual rate of 2.4 percent over the adjustment period. This severe slowdown in investment, cumulatively about twenty percentage points below baseline projections, lowers the economy's potential growth rate to 2.2 percent by 1993. Despite a declining potential growth rate, there is a buildup of excess capacity in the economy that largely accounts for the considerable fall in inflation and increase in the government budget deficit projected in this scenario.

These scenarios indicate how market-induced movements in the real exchange rate or the real interest rate might individually affect the U.S. economy. However, financial market shocks could have a significant impact on both variables. Thus, the implications of a market adjustment scenario, characterized by a substantial increase in the real interest rate and a decline in the real value of the dollar, are presented in the right hand columns of Table 7.[14]

Despite maintaining full employment growth, this scenario does not provide an attractive adjustment alterna-

[13]It should be noted that domestic demand growth recovers over 1994-97. However, for the period 1989-97 as a whole, demand growth is still considerably slower than that projected in the baseline, by over two and a half percentage points cumulatively.

[14]Note that we have specifically designed this scenario to evaluate a market-based alternative in which the economy adjusts while maintaining output growth close to its long-term trend.

Table 7

Possible Market-Induced Adjustment Paths

(Average Annual Percent Change)

	Large Real Exchange Rate Depreciation		Large Increase in the U.S. Real Interest Rate		Exchange Rate Depreciation and Rise in the Real Interest Rate	
	1989-93	1994-97	1989-93	1994-97	1989-93	1994-97
GNP	3.8	2.5	1.6	3.3	3.0	2.8
Domestic demand	3.1	2.9	1.0	3.6	2.4	3.2
Private consumption	3.2	3.1	1.4	3.6	2.6	3.3
Investment	3.5	2.2	−2.4	5.3	1.5	3.3
Real exchange rate†	2.5	0.0	0.5	0.0	1.9	0.0
	1993	1997	1993	1997	1993	1997
Current account (as a percent of GNP)	−1.1	−2.6	−1.1	−1.6	−1.0	−2.2
Net investment income (as a percent of GNP)	−1.0	−1.6	−1.6	−1.4	−1.2	−1.5
Budget balance (as a percent of GNP)	−0.3	0.4	−6.3	−3.7	−2.3	−1.0
Potential output	2.6	2.8	2.2	2.4	2.4	2.6
Prices (GNP deflator)	8.7	11.4	0.7	4.5	6.0	9.2
Nominal interest rate (level)	11.9	16.2	9.2	11.2	11.0	14.5
Real interest rate (level)	4.5	4.5	7.5	7.5	5.5	5.5
Net foreign assets (as a percent of GNP)	−11.5	−13.6	−17.8	−17.2	−13.3	−14.1

†(+) signifies depreciation.

tive. In fact, it incorporates undesirable characteristics of the other market adjustment scenarios. The current account improvement achieved when market forces significantly affect both the interest rate and the exchange rate is unsustainable. In addition, as a result of the weak investment performance during the adjustment period, the economy's potential growth rate declines.

By the end of our projection horizon in 1997, the U.S. current account deficit as a share of GNP stands only one-half of one percentage point below its 1988 level under this scenario. But a substantial price is paid for even this modest decline in the current account: nominal and real interest rates are higher, inflation has increased, and both net foreign debt and net interest payments are well above their 1988 levels in relation to GNP.

Before proceeding, we again caution that emphasis should not be placed on specific model estimates. Instead, identifying the broad contours of differing market scenarios and highlighting the tendency for market mechanisms to generate disruptive and unsustainable adjustment paths are of key importance. In addition, we note that the potential risks of market-induced adjustment mechanisms could be considerably larger than the ones depicted in these scenarios. Any path that generates a sharp acceleration in inflation or a substantial and persistent slowing in output (or both) runs an additional risk of precipitating other disruptions in the economy (for example, a disruption of financial or credit markets) that could significantly worsen the economic consequences of a scenario of this type.

U.S. policy-led adjustment

The market adjustment scenarios, while by no means inevitable, point to a set of forces that could reduce the U.S. current account deficit. We now examine adjustment paths generated by U.S. fiscal and monetary policy actions. It is often argued that active policy measures promoting adjustment are needed at least in part to avoid the economic costs embodied in potential market solutions. Thus, it is important to compare the possible outcomes of policy-led adjustment scenarios with those arising from market forces.

In seeking to reduce the current account deficit, U.S. authorities are somewhat constrained in their policy choices. In particular, our analysis suggests that U.S. monetary authorities, acting in isolation, cannot generate a feasible external adjustment path. Although a monetary contraction — defined as measures that raise the U.S. real interest rate — can reduce the current account deficit, the net improvement is small because it is limited by the appreciation of the dollar and the increase in debt service payments that are associated with rising interest rates. Consequently, the slowdown in growth and investment demand necessary to achieve adjustment through a monetary contraction is so large that it cannot be considered a realistic alternative.[15]

Thus, actions by fiscal authorities to slow domestic demand must be a necessary component of any policy measures geared toward reducing the U.S. current account deficit. Two possible scenarios of this type are presented in Table 8. The first combines a decline in government spending with monetary policy actions that leave the domestic real interest rate and the real value of the dollar unchanged. In the second case, a decline in government spending is accompanied by monetary policy actions that allow the real interest rate and the real value of the dollar to decline.

When the real interest rate and the real exchange rate remain unchanged, a fiscal contraction significantly slows overall activity growth during the adjustment period. GNP growth declines to 1.9 percent per year during 1989-93, more than one-half percentage point slower than in the baseline scenario; domestic demand growth of 1.5 percent annually represents a slowdown of more than a full percentage point from the baseline. Growth rates of consumption and private investment fall by roughly one percentage point per year from their respective baseline projections as the decline in government expenditures extends to all components of demand.

It is clear that a more favorable trade-off between adjustment and growth can be engineered when policy makers allow the real interest rate and the real value of the dollar to decline. In particular, adjustment in this scenario is consistent with maintaining output close to full employment. Indeed, annual GNP growth of 2.6 percent actually exceeds that projected in the baseline scenario over 1989-93. In addition, consumption growth does not appreciably slow over the adjustment period, and investment growth is over one percentage point faster per year than in the baseline projections.

When viewed together with other characteristics of this adjustment path — stable inflation (although admittedly still high), a relatively mild real depreciation of the dollar (about 5 percent cumulatively), and an increase in productive capacity relative to the baseline — the combination of a fiscal contraction with policies that reduce the real interest rate and the real value of the

[15]This conclusion would remain unchanged even if monetary authorities were able to maintain the dollar's value as they tightened policy. The economic consequences of such a scenario would be similar to those of the market-induced rise in the U.S. real interest rate discussed above. In addition, since the real effects of monetary policy actions are generally thought to dissipate over time, it is not clear that monetary policy offers a mechanism to achieve a sustained adjustment of the external balance.

dollar presents an attractive adjustment scenario.[16] Nevertheless, this scenario has one potential drawback. The necessary contraction in fiscal policy is large. The discretionary shift in fiscal policy—policy changes unrelated to business cycle fluctuations or changes in interest rates—amounts to more than $160 billion or roughly 3½ percent of potential GNP. (In comparison, a discretionary shift of about 2½ percent of GNP is required in the scenario in which the interest rate and exchange rate remain unchanged.[17]) Real government spending on goods and services, excluding transfer payments and debt service, must decline by more than 1 percent per year in order to achieve adjustment in this scenario. Overall, the general government budget balance rises from −1.8 percent of GNP in 1988 to +2.6 percent in 1993.[18]

These considerations aside, the policy-oriented adjustment scenarios present a preferable alternative to those arising from market forces. Unlike the market adjustment scenarios, policy actions can generate a current account improvement that will be sustained beyond the adjustment horizon. In addition, market-induced paths, while quite varied in their possible outcomes, appear to promote adjustment only at the expense of macroeconomic stability. A market-induced decline in the real value of the dollar fuels inflationary pressures while forces that increase the real interest rate lower investment and overall activity growth significantly.

Furthermore, a comparison of Tables 7 and 8 reveals that market adjustment scenarios involve a larger slowdown in domestic demand growth relative to output than their policy-led counterparts. Domestic demand increases at an annual rate that is six-tenths to seven-tenths of one percentage point slower than output under the market adjustment scenarios; this gap is

[16]The importance of allowing the real value of the dollar to decline under this scenario needs to be emphasized. By providing a boost to U.S. demand that arises from the external sector, the fall in the dollar's value both supports activity growth and promotes external adjustment. Our estimates indicate that economic activity would slow (by about three-tenths of one percentage point per year during 1989-93 to about 2¼ percent) if these policy actions took place in an environment of stable real dollar values.

[17]The larger contraction in fiscal policy required when the interest rate and the dollar decline can be seen as necessary to provide additional savings to finance the more rapid investment demand growth in this scenario.

[18]A more balanced contraction in fiscal policy in which personal taxes were increased would enable government spending to grow more rapidly because some of the burden of adjustment would fall on private consumption growth. However, the overall size of the fiscal contraction would be larger than 3½ percent of potential GNP since changes in tax policy have a smaller effect on domestic demand than direct changes in public sector spending.

Table 8

U.S. Policy-Led Adjustment Paths

(Average Annual Percent Change)

	Fiscal Contraction with Unchanged Real Exchange Rate and Real Interest Rate		Fiscal Contraction with a Decline in the Real Exchange Rate and in the Real Interest Rate	
	1989-93	1994-97	1989-93	1994-97
GNP	1.9	2.8	2.6	2.7
Domestic demand	1.5	3.0	2.1	2.8
Consumption	1.9	3.0	2.6	2.9
Government consumption	−0.2	2.6	−1.3	2.8
Investment	1.7	3.3	4.0	2.7
Real exchange rate†	0.0	0.0	1.0	0.0
	1993	1997	1993	1997
Current account (as a percent of GNP)	−1.2	−1.4	−1.1	−1.3
Net investment income (as a percent of GNP)	−0.7	−0.7	−0.5	−0.7
Budget balance (as a percent of GNP)	−0.2	1.1	2.6	3.5
Potential output	2.5	2.5	2.8	2.8
Prices	2.0	3.0	5.1	5.4
Nominal interest rate (level)	5.9	6.4	7.0	7.5
Real interest rate (level)	3.5	3.5	2.0	2.0
Net foreign assets (as a percent of GNP)	−14.2	−15.3	−11.8	−12.3

†(+) signifies depreciation.

four-tenths to five-tenths of one percentage point under the policy-oriented scenarios examined. This greater relative decline in demand can be attributed to two characteristics of the market adjustment path — the large deterioration in U.S. terms of trade that results from the dollar's decline, and the sharp rise in debt service payments that is due to higher interest rates. Both of these factors increase the real resources that must be transferred to foreign countries to achieve adjustment and thus are associated with a larger slowing in U.S. domestic demand relative to GNP.

Thus, our analysis indicates that a policy-managed external adjustment will likely involve lower economic costs than one arising from market forces. Although our policy-induced adjustment scenarios entail, at the least, a sharp slowing in domestic demand growth and a substantial tightening of fiscal policy in the coming years, they produce a more sustained and much more orderly path towards improvement in the current account than market mechanisms are likely to generate.

In this context, the importance of taking timely policy actions needs to be emphasized. Delaying action will almost certainly increase pressures in financial markets for the types of reactions discussed earlier. Admittedly, it is difficult to assess the extent to which these pressures will actually affect interest rates or the dollar. However, even a modest rise in U.S. real interest rates would raise the real costs of adjustment, increase financial market instability, and, over the long-term, have a significant adverse effect on U.S. economic performance.

If financial market conditions remain unchanged, the economic costs of external adjustment are still likely to become more severe the longer imbalances are allowed to persist. The adverse effects of the current account deficit on the economy's traded goods sector may, over time, lead to underlying structural shifts in the economy. As a result, a hysteresis may arise, such that the macroeconomic adjustments needed to restore trade balance increase the longer they are postponed. In addition, the accumulation of U.S. external debt that accompanies persistent current account deficits will increase debt service payments and thus the overall transfer of real resources that will be required when adjustment occurs.

The costs of delaying adjustment that stem from higher debt burdens can be assessed within the framework of our model. In the absence of measures promoting adjustment, the current account deficit rises rapidly in our baseline scenario, and by 1993 net debt service payments are roughly twice as large as those projected under scenarios (Table 8) in which policy measures are taken immediately. As a result of these factors, U.S. economic performance worsens if policy makers decide, for example, to wait until 1993 to take action to reduce the current account deficit to 1 percent of GNP by 1997. In particular, real output and demand grow by between two to three percentage points less over the 1989-97 projection horizon and greater fiscal tightening is required than in scenarios in which policy actions are taken immediately.[19]

The role of policy coordination

In examining medium-term scenarios of current account adjustment, we have assumed that foreign economic conditions are unaffected by changes in U.S. activity. Recognizing that much recent discussion has focused on the increased interdependence of the world economy and the importance of international policy coordination, we now consider how foreign and U.S. policy makers, acting in concert, might affect adjustment paths.

Two scenarios, designed to provide a coordination alternative to the policy-led adjustment simulations discussed in the previous section, are presented in Table 9. In both scenarios, foreign policy makers provide a temporary stimulus to growth abroad at the same time that U.S. fiscal policy contracts.[20] This coordination of demand policies is evaluated under two alternative monetary policy rules: (1) authorities here and abroad set monetary policy to hold real interest rates and the real value of the dollar unchanged; and (2) authorities allow the U.S. real interest rate to decline and foreign real interest rates to rise, thus lowering the real value of the dollar.

A comparison of Tables 8 and 9 indicates that there are potential gains from coordinating policies over the adjustment period. A temporary expansion in foreign growth provides a boost to U.S. activity while promoting external adjustment. As a result, a foreign stimulus helps cushion the effects of a U.S. fiscal contraction on output and demand growth. In the scenario involving unchanged real interest rates, real GNP and domestic demand can each grow three-tenths of one percentage point faster per year over 1989-93 when foreign demand growth temporarily rises.

In the scenario in which interest rates are allowed to change, the output gains from coordination are small.

[19]This conclusion is based on a comparison of the economy's performance over 1989-97 under two types of scenarios: 1) fiscal and monetary policy actions, delayed until 1993, work towards reducing the U.S. current account deficit to 1 percent of GNP by 1997; and 2) fiscal and monetary policy authorities take immediate action in 1989 to reach the same current account target by 1993.

[20]The expansion in foreign activity under these scenarios is assumed to raise foreign demand growth by one percentage point above the baseline projections in 1989 and 1990.

This result can largely be attributed to the policy design, which specifies that monetary authorities maintain output growth at a rate consistent with the economy's potential. However, by raising demand for U.S. exports, a foreign demand stimulus reduces the size of other measures required to bring about adjustment. The fall in the real value of the dollar amounts to less than 3½ percent in this scenario, compared with a decline of over 5 percent when U.S. authorities act on their own. At the same time, the required discretionary cuts in government spending amount to 3 percent of trend GNP when policies are coordinated, about one-half of one percentage point less than the contraction required when U.S. authorities act on their own.

These comparisons are, of course, sensitive to the particular coordination scenario presented. Moreover, since we do not fully account for international linkages in our model, this exercise is limited in its ability to capture the impact of policy coordination fully.[21] However, the analysis does highlight the potential improvements in U.S. economic performance that might be realized if foreign demand policies serve to dampen the contractionary effects of U.S. policy actions during adjustment. In particular, if authorities wish to stabilize exchange rates over the adjustment period, an acceleration in foreign growth coordinated with U.S. fiscal tightening can reduce the cost to the U.S. economy in terms of lost output and demand. At the same time, if authorities attempt to maintain output along its long-term path, the coordination of policies here and abroad can allow for more flexibility on the part of U.S. policy makers in achieving other macroeconomic objectives.

[21] In addition, no attempt is made to measure the effects or desirability of coordination from the viewpoint of foreign economies.

Conclusion

It is reasonably clear that significant changes in U.S. economic activity will be required to achieve a sustained reduction of the large external imbalances that have accumulated in recent years. In particular, an assessment of recent economic trends suggests that the virtual elimination of the U.S. merchandise trade balance, a substantial slowing in domestic demand growth, and an increase in the national savings rate will all accompany adjustment paths that do not endanger overall macroeconomic stability.

The U.S. current account deficit can be reduced in a variety of ways, however, and the actual path of economic activity in the coming years depends crucially on the actions of policy makers here and abroad as well as those of private agents. Using a simulation model of the U.S. economy, we have projected different scenarios offering a range of possible adjustment paths. Although these projections are only illustrative and cannot precisely represent the alternatives facing the

Table 9

Adjustment Scenarios with International Policy Coordination

(Average Annual Percent Change)

	Fiscal Policy Coordination with Unchanged Real Exchange Rate and Real Interest Rate		Fiscal Policy Coordination with a Decline in the Real Exchange Rate and in the Real Interest Rate	
	1989-93	1994-97	1989-93	1994-97
GNP	2.2	2.7	2.6	2.8
Domestic demand	1.8	2.9	2.2	2.8
Private consumption	2.2	2.9	2.6	2.8
Government consumption	0.2	2.7	−0.7	2.8
Investment	2.2	2.9	3.6	2.8
Foreign domestic demand	3.7	3.3	3.7	3.3
Real exchange rate†	0.0	0.0	0.7	0.0
	1993	1997	1993	1997
Current account (as a percent of GNP)	−1.2	−1.5	−1.1	−1.3
Net investment income (as a percent of GNP)	−0.7	−0.8	−0.6	−0.7
Budget balance (as a percent of GNP)	0.1	1.0	1.8	2.8
Potential output	2.5	2.7	2.7	2.7
Prices	3.3	4.4	5.4	5.7
Real interest rate (level)	3.5	3.5	2.5	2.5
Net foreign assets (as a percent of GNP)	−13.1	−14.2	−12.0	−12.2

†(+) signifies depreciation.

U.S. economy, they nevertheless provide a relevant basis for comparing different adjustment mechanisms.

The results of this analysis strongly suggest that there are significant risks in failing to take timely action to reduce the U.S. current account deficit. At the least, postponing the adjustment process until the mid-1990s will lead to a more substantial slowdown in output and demand growth over the next decade than is likely to occur if actions promoting adjustment are taken immediately. Moreover, inaction on the part of policy makers could risk market-induced shocks that would reduce the current account deficit only at the cost of a significant disruption in U.S. activity.

In contrast, an appropriate mix of U.S. monetary and fiscal actions can generate an adjustment path consistent with other major macroeconomic policy objectives. Although domestic demand growth will be required to slow to close to 2 percent per year, the combination of a fiscal contraction and proper monetary policy actions can produce a substantial current account improvement while maintaining full employment, avoiding upward pressure on price inflation, and preserving the economy's long-term growth prospects.

Our analysis further indicates that the coordination of domestic and foreign policy actions along the adjustment path can improve the trade-offs facing the U.S. economy. A stimulus to foreign domestic demand in conjunction with contractionary policies in the U.S. would allow for faster output growth and would reduce the magnitude of U.S. policy changes required during adjustment. Thus, coordinated policy measures by authorities here and abroad may offer the greatest potential for reducing the U.S. current account while maintaining macroeconomic stability in the coming years.

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Appendix: A Model of the U.S. Economy

This appendix presents the equations that make up our model of the U.S. economy. The behavioral equations are based on specifications standard in the empirical literature.† The short-term dynamic properties of these relations have, however, been simplified, reflecting our focus on the medium-term properties of the simulations.

The model can be broken down into three sectors: aggregate demand, aggregate supply and wealth accumulation, and a price sector. All variables are expressed in constant 1982 dollars unless otherwise stated, and the intercept term in each equation (ϵ) is set such that the model generates projections corresponding to actual values for 1988.

Aggregate demand

Aggregate demand, the sum of domestic demand, DD, and net exports, (X − M), equals output, Y.

$$(1)\quad Y_t = DD_t + (X_t - M_t).$$

Domestic demand is the sum of consumption, C, private investment, I, and government spending on goods and services, G.

Private consumption is a function of disposable income, YD, private wealth, W, and the real interest rate, r:

$$(2)\quad ln\ C_t = \epsilon_0 + 0.8 ln YD_{t-1} + 0.2 ln YD_{t-2} + 0.03 ln W_{t-1} - 0.002 r_{t-1}.$$

Private investment demand is a function of the capital output ratio, (K/Y), the real interest rate, and the rate of output growth:

$$(3)\quad ln\ I_t = \epsilon_1 + 1.09(ln Y_{t-1} - ln Y_{t-2}) + .79(ln Y_{t-2} - ln Y_{t-3}) - 1.20[ln K_{t-1} - ln Y_{t-1}] + ln K_{t-1} - 0.04 r_{t-1}.$$

By assumption, government spending on goods and services is maintained as a constant fraction of potential output, Y^P:

$$(4)\quad G_t = 0.197 Y^P_t.$$

Net tax receipts (including net transfers) of the government, T, are the sum of net business tax receipts, TB, and net household tax receipts, TH:

$$(5)\quad T_t = TB_t + TH_t.$$

Business tax receipts are assumed equal to a constant share of output. Net household tax receipts are

†The basic structural properties of our model are similar (albeit at a considerably higher level of aggregation and with less detailed short-term dynamics) to the properties of the U.S. component of the multicountry model developed by the Federal Reserve Board. For a more detailed description of the multicountry model, see Hali Edison, Jaime Marquez and Ralph Tryon, "The Structure and Properties of the FRB Multicountry Model," pt. 1, "Model Description and Simulation Results," International Finance Discussion Papers, no. 293, October 1986.

Appendix: A Model of the U.S. Economy *(continued)*

made up of two components: one assumed equal to a constant share of output and the second depending on the output gap:

$$(6)\ TH_t = 0.043Y_t + 20(lnY_t - lnY^P_t).$$

The public sector deficit, expressed in current dollars, equals government expenditures on goods and services plus net government interest payments on the stock of public debt, PD, less net tax receipts:

$$(7)\ D_t = P_tG_t + i_t{}^*PD_{t-1} - P_tT_t,$$

where i* is an average interest rate based on current and lagged values, and P is the GNP deflator.‡

Disposable income is equal to personal income (Y — H) less household taxes. The difference between output and personal income, H, is assumed to remain constant as a share of output:

$$(8)\ YD_t = (Y_t - H_t) - TH_t.$$

Exports, X, consist of exports of goods and services excluding factor income receipts. They are an increasing function of foreign domestic demand, DDF, and a decreasing function of the price of exports, P^x, relative to foreign prices, PF, expressed in dollar terms:

$$(9)\ lnX_t = \epsilon_3 + 2.0ln\ DDF_{t-1} - 1.3[lnP^x_{t-1} - (lnE_{t-1} + PF_{t-1})],$$

where E equals the exchange rate (dollars per foreign currency), and foreign domestic demand and foreign prices are assumed to follow exogenously given paths.

Imports, M, consist of imports of goods and services excluding factor income payments. They are an increasing function of domestic demand and a decreasing function of the dollar price of imports, P^m, relative to domestic prices:

$$(10)\ lnM_t = \epsilon_4 + 2.2lnDD_{t-1} - 1.4(lnP^m_{t-1} - lnP_{t-1}).$$

The current account, in current dollars, consists of net exports of goods and services plus net investment income payments, NII:

$$(11)\ CA_t = P^x_tX_t - P^m_tM_t + NII_t.$$

Net investment income payments in current dollars are assumed to be a function of the stock of net foreign assets and a rate of return of i*:

$$(12)\ NII_t = \epsilon_5 + i_t{}^*NFA_{t-1},$$

where ϵ_5 is an adjustment factor intended to account for differences in the rates of return on foreign and domestic asset holdings.

Aggregate supply and wealth accumulation

Potential output, Y^P, depends upon the full capacity supplies of labor, N, capital, K, and total factor productivity, t. Beginning with the assumption that U.S. GNP was equal to potential during 1987, we project the path of potential based on rates of capital accumulation and an assumed growth rate of the labor force of 1½ percent per year. Total factor productivity is assumed to follow a stable time trend:

$$(13)\ ln\ Y^P_t = \epsilon_6 + 0.75lnN_t + 0.25lnK_t + 0.009t.$$

The capital stock is a function of the level of investment. It depreciates at a constant rate:

$$(14)\ K_t = 0.925K_{t-1} + I_t.$$

Private wealth is the sum of the public sector debt, PD, the capital stock, K, and net foreign assets, NFA:

$$(15)\ W_t = PD_t/P_t + K_t + NFA_t/P_t.$$

The stock of public debt changes in line with the public sector deficit:

$$(16)\ PD_t = PD_{t-1} + D_t.$$

The net foreign asset position of the economy expressed in current dollars is an increasing function of the current account surplus:

$$(17)\ NFA_t = \epsilon_7 + NFA_{t-1} + CA_t,$$

where ϵ_7 is an adjustment factor included to account for divergences between changes in the stock of net foreign assets and the current account balance.

Prices, interest rates, exchange rates

Price inflation in the GNP deflator is determined by the output gap, past price changes, and changes in import prices, P^m:

$$(18)\ ln\ P_t = \epsilon_8 + lnP_{t-1} + 0.6(lnY_{t-1} - lnY^P_{t-1}) + 0.3(lnP_{t-1} - lnP_{t-2}) + 0.12(lnP^m_{t-1} - lnP^m_{t-2}).$$

‡In order to determine the nominal budget deficit in 1988, real government spending and real net tax receipts are converted into current dollars using their respective price deflators. However, during the projection period, price deflators for these variables are assumed to move with the GNP deflator.

Appendix: A Model of the U.S. Economy *(continued)*

Export prices are a function of domestic prices and prices of foreign goods expressed in dollar terms:

(19) $ln\ P^x_t = \epsilon_9 + 0.7 ln P_{t-1} + 0.3(ln E_{t-1} + ln PF_{t-1})$.

Dollar import prices are a function of foreign prices, expressed in dollar terms, and domestic prices:

(20) $ln\ P^m_t = \epsilon_{10} + 0.7(ln PF_{t-1} + ln E_{t-1}) + 0.3(ln P_{t-1})$.

The nominal interest rate, i, is determined by monetary authorities. The real interest rate, r, is equal to the nominal interest rate minus inflationary expectations that are assumed to be equal to the lagged inflation rate:

(21) $r_t = i_t - 100(ln P_{t-1} - ln P_{t-2})$.

The real exchange rate, ER, is determined by assuming (1) covered interest parity holds so that the difference between domestic real interest rates and foreign real interest rates, rf, is equal to the expectations of dollar depreciation plus the risk premia, z, on holding dollar assets:

(22) $r_t - rf_t = 100[ln ER_{t+1} - ln ER_t] + z_t$,

and (2) the real exchange rate returns to its equilibrium level, $\overline{ER}$, at a constant rate:

(23) $ln ER_{t+1} - ln ER_t = 0.33[ln \overline{ER}_t - ln ER_t]$.

Combining (22) and (23) yields:

(24) $ln ER_t = ln \overline{ER}_t - 0.033\ (r_t - rf_t - z_t)$.

The nominal exchange rate is calculated from the real exchange rate and relative domestic and foreign price levels:

(25) $E_t = ER_t\ P_t/PF_t$.