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THE CURRENT ACCOUNT OF THE UNITED STATES, JAPAN, AND GERMANY: A CYCLICAL ANALYSIS

by

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I. Introduction and Summary

The current account positions of the major industrial countries have undergone very large swings in the past three years. Most observers now expect the U.S. current account, which was in surplus in 1981, to show a record deficit in 1983, and an even larger deficit in 1984. Swings in the Japanese and German current accounts have been equally dramatic in the opposite direction, moving from deficit to surplus. The possible continuation of these deficits is a source of concern to policymakers to the extent, for example, that they and the factors underlying them give rise to protectionist pressures or involve significant adjustment costs in tradable goods sectors.

Several factors have been cited for the projected increase in the U.S. current account deficit on one side and the surpluses of Japan and Germany on the other. One involves exchange-rate developments: the appreciation of the dollar in real terms against the yen and the mark since 1980 has led to a substantial loss in U.S. price competitiveness. A second involves cyclical developments: the U.S. recovery from the 1982 recession has been and is expected to continue to be significantly stronger than the recovery elsewhere, leading to a relative boom in U.S. import demand. A third concerns the effects of the sharp drop in the imports of debt-burdened developing countries.

The present paper focuses on the cyclical factor, and attempts to gauge the quantitative importance of the cyclical components of the recent and expected current account positions in the three countries. It

also considers, briefly, the relative importance of the drop in exports to developing countries.

Our method of analysis, outlined in Section II, is to estimate how the current accounts of the three countries would differ from baseline paths if output in the three countries (and the rest of the world) reached "cyclically neutral" paths over the next three years. The estimates are made using two versions of the Federal Reserve Board Staff's Multicountry Model (MCM). The results obtained depend importantly upon the structure and parameters of the model employed, as well as on the projected baseline and cyclically neutral paths for output we have chosen. One version of the model treats GNP and all other determinants of each country's balance of payments as exogenous variables. The other treats non-GNP determinants of the balance of payment accounts endogenously. In this case the desired GNP paths are reached through the application of monetary and fiscal policy measures: other factors that affect the current account, including prices, interest rates and exchange rates, are allowed to fluctuate endogenously.

The baseline path, described in Section III, is for the most part taken from available published forecasts. The cyclically neutral output paths are described in Section IV. In view of the inherent difficulties involved in measuring cyclically-neutral or potential output paths, we have chosen two measures. These include a "peak-to-peak" trend and a "normal" trend, both calculated from historical data over the past ten years. Our intention here was not to derive precise measures of potential output, but rather to define paths that appeared to be both free of cyclical fluctuations and realistically attainable over the next three years.

The results, presented in Section V, suggest that the cyclical

component of the U.S. current account is surprisingly small, and that the cyclical components of both the U.S. and Japanese current accounts could be in the "wrong" direction. That is, if output were adjusted to the cyclically neutral paths we have defined, both the U.S. deficit and the Japanese surplus would be larger than currently expected.

This result is obtained for two reasons. First, despite its strong recovery in 1983, U.S. output still has further to go to reach its cyclically neutral path than does output in other major countries on average, and in Japan in particular. This is partly because the recent recession was relatively deeper in the United States. Also, Japan's output gap is small, based on our definition of cyclically neutral growth in terms of the trend observed during the 1970's. This trend yielded a cyclically adjusted growth rate of about 4 percent for Japan, somewhat below the average observed during the 1960's. In our judgment the more recent experience provided the more realistic basis for defining an attainable growth path for Japan in the near term. Even so, we did make an effort to maximize Japan's output gap by assuming a relatively low baseline growth rate of 3-1/2 percent.

The second reason for our estimate of a small cyclical component in the U.S. case, is that the MCM's estimated income elasticities of import demand are somewhat larger for the United States than for other countries, on average.

Our simulation results also suggest that the estimated cyclical component of current accounts can differ significantly if allowance is made for cyclical movements in other variables besides GNP, depending upon the mix of policies employed to achieve the cyclically neutral GNP. If, for example, fiscal stimulus is used in the United States and monetary stimulus abroad, U.S. real interest rates rise relative to

foreign rates, the dollar appreciates, and the cyclically adjusted U.S. current account becomes more negative, while those of other countries become more positive.

We found in analysing recent trends in exports to developing countries, that U.S. exports to these countries fell about $5 billion more than German and Japanese exports between 1981 and the first half of 1983. This accounts for only a small part of the total swing in the relative current account positions of these countries over this period.

We conclude that the relative movements in the U.S. and Japanese current accounts over the period 1982-83 and beyond are likely to have been predominantly the result of movements in real exchange rates. Cyclical factors do appear to have played a role in increasing the German current account surplus, although exchange rate changes also appear to have contributed significantly. The implication of this conclusion is that even if major industrial countries succeed in attaining cyclically normal output paths in the next few years, relative current account positions, particularly those of the United States and Japan, could remain roughly unchanged for some time. Significant readjustment in current account positions probably would require a significant reversal of the real exchange rate movements that have taken place in recent years.

Such a change in exchange rates could be brought about by any number of possible events. Our simulation results suggest that a shift in policy mixes toward fiscal restraint in the United States and fiscal easing in other industrial countries would tend to reduce U.S. real interest rates relative to foreign rates, and put downward pressure on the dollar. Shifts in market expectations about the long-run

sustainability of large current account imbalances, or in preferences for dollar-denominated assets could also bring about a substantial depreciation of the dollar.

II. Design of Experiment and Description of Model

The concept of cyclical adjustment of current account positions is by no means new, although the published literature on this subject is scant. During the Bretton Woods era of pegged exchange rates analysts in national governments and international organizations made such computations for policy makers for the purpose of assessing the appropriateness of underlying demand management policies. Since the move to more flexible exchange rates in the early 1970's, the analysis has been used instead as an indicator of movements in real exchange rates needed to achieve "sustainable" long-run current account positions.

To date, attempts to quantify the cyclical components of current account balances have focused on the effects of cyclical swings in real activity on trade flows. (See, for example, Artus (1978) and Williamson (1983)). The methodology typically involves relating the components of trade or current account balances to income or activity at home and abroad, relative prices, exchange rates and other factors in a model framework. Cyclically-adjusted balances are then computed by substituting cyclically-adjusted paths of home and foreign income or activity for the actual cyclical paths of these variables, and deriving the model's prediction under the alternative paths.[1/] Henceforth, we shall refer to this methodology as the "partial-equilibrium approach", since it treats the various determinants of external balances as exogenous variables in partial-equilibrium models of those balances.

In the present paper we also introduce a more general methodology that treats all of the major determinants of the current account endogenously and takes into account the effects of cyclical fluctuations in prices, interest rates and exchange rates, as well as real activity. This methodology, which we label the "full-model approach", involves solving the model for policy paths across countries that achieve predetermined levels of cyclically-adjusted output in those countries. The policy shifts also affect the other variables in the model. An important implication of this approach is that the estimated cyclical component of the current account can vary depending upon which policies are used to achieve the given cyclically-adjusted income paths.[2/] This is because the effects on non-income determinants of the current account (prices, interest rates and exchange rates, etc.) will vary under different policy settings.

The model employed in our analysis is the Federal Reserve Board staff's Multicountry Model (MCM). The MCM consists of a system of fully developed macro models of five countries--the United States, Japan, Germany, Canada and the United Kingdom--as well as an abbreviated rest-of-world sector. The major determinants of current accounts (GNP, capacity utilization, prices, interest rates, exchange rates and stocks of real and financial foreign claims and liabilities) are treated endogenously. The rest-of-world sector includes the determination of income and prices (which are linked to income and prices in the five MCM countries), trade flows and some (OPEC) financial flows.[3/]

One significant adjustment was made to the basic structure of the MCM for purposes of the full-model exercise. The exchange rate

determination sector was replaced with a set of simplified equations in which bilateral rates of the dollar against the currencies of the other four countries were constrained to move proportionally with each country's prices relative to U.S. prices and with real interest differentials.[4/] This adjustment was made in order to simplify the the analysis. In the original version of the model exchange rates also respond to shifts in current accounts in an equilibrating direction (i.e, a deficit causes a depreciation, which reduces the deficit). Since part of the reason for undertaking this exercise was to draw implications about the exchange rate, we decided to abstract from the response that was built into the model.

In Section V we present estimates of cyclically-adjusted current accounts based on both the partial-equilibrium and full model approaches described above. For purposes of the partial-equilibrium estimates, most of the determinants of the current account were treated exogenously (i.e. equations for incomes, prices, interest rates, etc., were dropped from the model). However, we did allow for changes in net foreign asset stocks resulting from shifts in current account positions. (These asset stocks enter directly into the determination of net investment income.)

The partial-equilibrium approach was used to calculate both historical and forward-looking estimates of cyclically-adjusted deficits. The historical analysis involved setting output in the five MCM countries plus the rest-of-world sector to cyclically-adjusted paths (defined in Section IV below) during 1982-83 to determine the cyclical components of current accounts over that period. This exercise has the advantage of

working from a baseline of actual historical data, though the results may be of limited value to the formulation of economic policy currently, that will have an impact over the next few years.

The forward-looking estimates involve comparing a baseline projection through 1986 with a projection in which incomes grow to cyclically-adjusted or potential levels by the end of 1986. (The baseline projection is described in the next section.) This exercise has the disadvantage of working from a projected or hypothetical baseline path, but the advantage of being of greater relevance to current policy decisions.

The full model approach was employed only in forward-looking simulations. In this case several different policy paths were chosen to achieve potential or cyclically-neutral output levels by 1986. These included, a mix of monetary and fiscal stimulus and a pure fiscal stimulus (with no monetary accommodation).

III. Baseline Projections

In order to run forward-looking partial-equilibrium and full model simulations out to 1986, baseline paths for the current accounts and their key determinants had to be constructed. We chose not to use the model itself to produce paths for the key variables (current accounts, trade flows, GNP, prices, and exchange rates). Rather, paths for these variables were for the most part assumed *a priori* and imposed on the model.

The assumed paths, presented in Table 1, were based largely on actual values and linear extrapolations of forecasts published by *Blue Chip Worldscan*, which surveys the regular forecasts of some forty private

economic forecasting concerns.[5/] These paths were imposed on the model by adjusting residuals in the model's behavioral equations. The numbers given in Table 1 deviate somewhat from the published forecasts inasmuch we tried to make the assumed paths for GNP, prices and exchange rates at least roughly consistent with those for current accounts, given the model's structure. We emphasize that our intention here was not to make point forecasts but to derive plausible paths for key variables as a baseline for the simulations presented.

The baseline can be described as follows. The strong recovery of U.S. GNP in the second half of 1983 continues into early 1984 and then begins to taper off. By 1986 the growth rate has fallen almost to the rate of growth of potential output (as defined in the next section). GNP growth rates in Japan and Germany pick up somewhat in 1984 (in line with recent growth), but remain in the neighborhood of those countries' potential growth rates through 1986.

Our assumption for U.S. GNP growth in 1985-86 is about 1 percentage point above the Blue Chip panel's average, while that for Japan is 1/2 percentage point below the average. These paths were selected to be consistent with unchanged current accounts through 1986 and to emphasize the cyclical differences among countries.

CPI inflation rates are for the most part extrapolated at recently reported rates. The U.S. inflation rate rises in 1984, reflecting the effects of an assumed depreciation of the dollar. The inflation assumptions are well within the range of the Blue Chip forecasts but are about 1/2 - 1 percentage point below the average of the forecasts for each country. The published forecasts predict a moderate

decline (of about ten percent) in the dollar against the mark and yen next year; we have assumed a slight additional depreciation of the dollar in 1985 in light of current account considerations.

Recent historical and baseline current account paths are illustrated in Figure 1. The U.S. current account deficit increases to about $70 billion in 1984. This is somewhat above the Blue Chip range (several forecasters had $60 billion). We have made this adjustment in view of the sharp increase in the U.S. trade deficit in recent months, and the likelihood that continued rapid U.S. growth will widen the deficit further in the near term. The U.S. deficit remains unchanged at $70 billion through 1986, as the effects of higher growth in the United States (as well as higher import elasticities there than in the other countries) are offset by the effects of the depreciation of the dollar in real terms. Likewise, Japan's surplus remains at about $20 billion and Germany's at $8 billion, both slightly ($1-2 billion) above the Blue Chip average for 1984.

Since the focus of our analysis is on the current account position of the United States, Japan and Germany, it is useful briefly to review the recent movements in those series and their underlying factors. As indicated in Table 2, the U.S. current account fell by $30 billion at an annual rate from its peak in 1981 to the first half of 1983. Of this decline roughly two-thirds was in terms of merchandise trade, and one-third in terms of net services and transfers. By the third-quarter of 1983, the trade balance had fallen another $25 billion, to a deficit of more than $70 billion. Given early indications of continued robust U.S. recovery in the fourth quarter, the deficit seemed likely to widen further.

The increase in the U.S. deficit has been attributed to three factors: the appreciation of the dollar in real terms since 1980, a sharp decline in the imports of developing countries (particularly those burdened with large debt service payments), and the relative strength of the U.S. recovery (that is, cyclical factors).

As indicated in Table 3, in the past five years the dollar has appreciated by 61 percent in real terms against the yen and 65 percent against the mark. Although these movements followed a general decline in the dollar during the mid-1970's, they substantially altered U.S. price competitiveness relative to that of Japan and Germany in the past few years. This shift in price competitiveness not only reduces the U.S. trade position, but also contributed to the increase in the Japanese and German surpluses. The effects on Japan and Germany have been less pronounced because their currencies fell considerably less in real terms (and in some cases rose) against non-dollar currencies.

The effects of the second factor, the debt problem and the contraction of demand in developing countries, are illustrated in Table 4. The table lists U.S., Japanese, and German exports to all countries, to all developing countries, (including OPEC) and to eight major debtor countries. Between 1981 and the first half of 1983, U.S. exports fell by by almost $12 billion. All of this was accounted for by a drop in exports to developing countries, of which $8.5 billion was to major debtor countries. Part of the decline could have reflected the decline in U.S. price competitiveness, but it is noteworthy that over the same period, Japanese and German exports to developing countries and major debtor countries fell (proportionally) at about the same rate as U.S. exports to these areas. Nevertheless, U.S. exports were affected more

than either German or Japanese exports in absolute terms, because debtor countries account for a higher portion of U.S. exports.

The third factor, cyclical swings in income and other variables is the focus of the remainder of this paper. It should be noted that service flows can be significantly affected by cyclical factors, just as trade flows are. Most of the decline in U.S. net services between 1981 and the first half of 1983 was accounted for by a drop in direct investment income receipts, reflecting the decline in economic activity and profits in other countries during that period.

Finally, before turning to the cyclical analysis, we should caution that analysis of current account positions is subject to potentially severe statistical constraints. Most notable is the existence of a very large discrepancy in the aggregation of global current accounts. That is, the total of all countries' current account positions, which in principle should sum to zero, summed to -$56 billion in 1981, - $100 billion in 1982 and possibly an even greater magnitude in 1983.[6/] Analyses by the OECD and IMF suggest that a substantial part of this discrepancy involves the underreporting of service account receipts in the current accounts of industrial countries and OPEC. Based on a purely mechanical allocation of the discrepancy by shares in the trade of industrial countries, the U.S. current account deficit in 1983 could be overstated by as much as $20 billion, while the surpluses of Japan and Germany could be understated by roughly $10 billion and $15 billion, respectively.

IV. Calculation of Cyclically Neutral GNP paths

In defining our measures of cyclically neutral output we begin with the concept of potential GNP. That is, at any one time there exists a sustainable level of real output at which resources in the economy are "fully" employed. We further assume that the level of potential GNP grows at a rate that is roughly constant over the period we are investigating. Full employment growth is defined not in any absolute sense, but rather using recent experience as a standard.

An implication of this approach is that there is no inherent business cycle. Deviations of output from its potential path can, in principle, be eliminated by selecting an appropriate policy mix. However, the policies needed to maintain this level of output in the face of various exogenous shocks might require unacceptably large deficits or increases in the money supply; we do not argue that it is necessarily desirable to achieve potential GNP. Furthermore, in an uncertain world it is difficult for policy makers either to specify or to implement the "appropriate policy mix."

One measure we use, as an approximation of potential output, is a peak-to-peak trend. This is a simple linear interpolation between the two highest peaks in actual output over the period 1972-1982. The series is extended through 1986 using the same growth rate. Although the details differ across countries, the two peaks roughly precede the two OPEC oil price shocks of 1974 and 1979. (Our interpretation is thus that while potential growth may have been altered by the earlier price shock, it was not substantially affected by the more recent one.) We have chosen to abstract from the levels of capacity utilization and unemployment prevailing at the two peaks, because of the statistical

problems associated with measuring capacity utilization, and because of the considerable variance over time in measured natural (noninflationary) rates of unemployment. While the peak-to-peak trend may lie below the maximum possible level of output at any given point in time, our intention is to define a feasible and sustainable path for the near future, based on recent historical experience.

A second measure we employ, termed "normal output", uses the rate of growth of potential output implied by the peak-to-peak measure, but reduces the calculated level of that path by a constant percentage. The reduction is such that the means of the actual and cyclically adjusted output paths are equal over the period 1973-1982. This adjustment is made since it seems conceivable, and perhaps even probable, that peak levels of output could not be sustained over time under reasonable policy regimes.

Table 5 shows the current (1983Q3) output gaps, measured as a percentage of current real output, for each country using the two alternative measures of cyclically neutral output. The table also shows the estimated annual growth rate of potential output, and the rate of growth that would be needed to reach potential by the end of 1986.

Japan stands out with by far the smallest output gap among the five countries. Japanese output is currently running very slightly above its "normal" path, and is only 2.7% below projected peak-to-peak potential. The other countries range from 2.7 to 6.2 percent below normal output, and 7.2 to 10.7 percent below peak-to-peak potential. The United States is in the middle of the group; it is "ahead" of Canada and Germany in the business cycle, but the difference is not striking, compared with the relative position of Japan.

Japan also has the fastest growth rate of peak-to-peak growth at 3.9%. It is a full percentage point higher than the values for the United States, Germany, and Canada, which are grouped at around 2.8%. The figure for the United Kingdom is 1.3%. The growth rates needed to reach potential are in the range of 4 - 6-1/2% per year, except for the United Kingdom; this would require a strong recovery, but not one that is outside the bounds of historical experience.

Figures 2 and 3 illustrate the alternative potential output paths as well as our baseline paths for real GNP. In all countries but Germany the baseline case is for output to come near to its "normal" path by 1986; in Germany the output gap remains roughly constant.

The definition and measurement of potential output raises difficult conceptual problems, and the measurements proposed here are to some extent arbitrary. We also ran the simulations reported in this paper using measures of potential output reported by the OECD.[7/] The results did not differ significantly from those reported here, which gives us some confidence that our measures of potential output are at least plausible. Again, they attempt merely to define a reasonable path for the economy at high employment, not necessarily to measure the ultimate capacity of the economy.

V. Simulation Results

This section describes the results of the model simulations outlined in Section II. The simulations involve moving real output from historical or projected baseline paths to cyclically-adjusted (potential and normal) paths as defined in the preceding section. For this exercise we assumed that real activity in the rest-of-world sector (including

developing countries) would move in proportion to activity in the five MCM countries.[8/] The results, for the most part, are reported in terms of deviations from the historical and projected baseline. We first employ the international accounts sectors of the U.S., German, and Japanese models in the MCM for partial-equilibrium analysis. In these simulations only the variables determined in the balance of payments accounts are endogenous. Real incomes change exogenously but prices, interest rates, exchange rates, and all other variables not determined directly in the balance of payments accounts are fixed. In Figure 4 we show the results of two "historical" simulations in which real output is assumed to follow potential and normal output paths starting in 1982. The figure shows the results for the current account, compared with the historical baseline, for the three countries. (All current accounts are measured in billions of U.S. dollars, at annual rates.)

The top panel of Figure 4 shows the paths for the U.S. current account. In the potential output simulation the U.S. deficit is substantially larger than in the baseline case. This is chiefly because in 1982 the U.S. had a larger output gap than its trading partners, particularly Japan. Raising all countries to potential in 1982 raises U.S. income by more than the increase in the average of its trading partner's income, and U.S. imports increase more than do U.S. exports. Another factor that contributes to the initial widening of the U.S. deficit is that the MCM's U.S. income elasticity of import demand is somewhat higher than the import elasticities in other countries.[9/] Thus, even if all countries grew at the same rate, the U.S. deficit tends to widen. By the end of the simulation period the output gaps for all

countries are smaller and thus the differential impact on the U.S. current account is much smaller than in 1982.

The second simulation shown on this figure is the case where real output is assumed to follow the normal growth path, starting in 1982, for all countries. The U.S. current account initially goes further into deficit, as compared with the baseline case, but in 1984 the trend is reversed and the deficit is gradually reduced through 1986. Again, this is because the United States has a relatively large output gap in 1982. However, the baseline output path for the United States reaches the normal growth path by 1986, while Germany and Japan remain somewhat below their normal paths. Thus in the normal growth simulation foreign output eventually increases more than U.S. output, and U.S. exports rise more than U.S. imports.

The implication of this exercise is that the relative cyclical position of the United States has made the U.S. current account deficit over the past two years smaller than it would have been if full output at home and abroad had been maintained at peak-to-peak (or even normal) trend levels during this period, ceteris paribus. The outlook for the U.S. current account in 1986 would be somewhat stronger if the world followed a normal growth path over 1982-86, but a large deficit would nonetheless exist. If output remained at peak-to-peak levels throughout this period the U.S. deficit would exceed its baseline value even in 1986.

The second panel of Figure 4 shows the results for Germany. As for the United States the peak-to-peak output scenario raises German output relative to the average, raising imports more than exports and causing the current account balance to deteriorate. In the German case

the deterioration is enough to send the current account into deficit after a few quarters. German output in both high-output cases is well above the baseline through 1986; this means that the deterioration in the current account continues throughout the simulation.

The Japanese results, shown in the third panel, complement those for the United States and Germany. Because Japanese output remains very close to both the normal and peak-to-peak paths in the baseline case, both simulations increase foreign output much more than Japanese output, leading to a large and continuing surplus on current account.[10/]

Figure 5 shows the results of two forward looking simulations run with the partial-equilibrium model. In these simulations output in each MCM country is assumed to grow steadily from the current (1983Q3) value to the potential, or normal, level in 1986Q4. The results follow the general pattern of the first exercise: growth along the higher output paths leads to a continued deficit for the United States. On the potential growth path the U.S. deficit is increased; on the normal path it is reduced. In Germany the current account balance deteriorates and eventually goes into deficit on both paths, while in Japan the surplus increases steadily. By 1986 the two sets of simulations reach roughly the same points for all countries; in the second set the adjustment toward that point is more gradual, because the change in output paths is more gradual.

The next set of simulations was run using the fully linked MCM. In these exercises each country was assumed to follow a growth path in which real output reached its cyclically neutral (potential or normal) path by the end of 1986. Fiscal policy (government spending) was made

endogenous in order to meet the target path for output Monetary policy was assumed to be at least partially accommodating in Germany and Japan and less so in the United States.

Figure 6 shows the results for the current account balances for the three countries in the two full MCM simulations. The results are broadly similar to those for the partial equilibrium simulation (compare Figures 5 and 5), but there are some interesting differences. In the potential output simulation, the U.S. balance deteriorates much more sharply in the full model simulation, reaching $100 billion by the end of the exercise, as compared with $80 billion in the partial-equilibrium case. This difference can be traced to the behavior of U.S. interest rates--which rise substantially compared to foreign rates--and their impact on the exchange rate. As indicated in Tables 6 - 8, the impact on U.S. interest rates exceeds that on Japanese and German rates by over 100 basis points in 1985 and nearly 300 basis points in 1986.[11/] This interest differential leads to a real appreciation of the dollar vis-a-vis the yen and the DM, and U.S. goods imports rise relatively more than exports. (Net investment income receipts are also up substantially with the rise in U.S. interest rates.) The relative depreciation of the yen and the DM improves the current account in both Japan and Germany, so that Japan runs a larger surplus, and Germany a smaller deficit, than in the partial equilibrium results.

In the simulation involving growth to the normal path U.S. output stays fairly close to its baseline, and no interest differential develops. There is very little change in exchange rates, and the results for all three countries are very similar in the partial equilibrium and

full MCM simulations. It is noteworthy that in this case the U.S. current account increases substantially more than the U.S. trade balance. This is because the Canadian output gap is relatively larger than those of other countries in the normal case and Canadian activity has a disproportionately large impact on U.S. direct investment income receipts.

We also ran a simulation with the full MCM in which monetary policy was assumed not to be accommodating--we exogenized M2 in Japan and central bank money in Germany. In this case Japanese real interest rates rise somewhat more than U.S. rates and German rates almost as much as U.S. rates. As a result, the dollar depreciates slightly against the yen and appreciates only slightly against the mark. By 1986 the Japanese current account is about $3 billion lower, the German current account about $2 billion lower and the U.S. current account about $4 billion higher than in the accommodating case.

It is also of some interest to consider the simulations as policy packages. The exercises presented in Tables 6-8 can be viewed as a coordinated use of fiscal policy to achieve potential output by 1986. It should be stressed that the MCM in general and these simulations in particular, were designed with most attention given to the international linkages among the countries in the model. The domestic sectors of the country models in the MCM are highly aggregated, and embody a fairly conventional neo-Keynesian, IS-LM model of the macro economy. Moreover, inflation expectations are specified only very crudely (generally as a function of a distributed lag of past inflation). As with any econometric model, the interpretation of the simulation results is conditional on the theoretical and empirical structure of the model.

The top half of Table 6 shows that in the United States, government spending (at all levels) rises steadily, to a level 17% above the baseline in 1986. This raises the aggregate government deficit by $60 billion and raises real output by 5 percent. The increase in inflation which results is relatively small, 8 percent by the end of 1986; the price impact is moderated somewhat by the appreciation of the dollar. The (nominal) short-term interest rate rises by 3.5 percentage points by the end of the simulation; this which gives some measure of the "crowding out" of private investment that would occur. The increase in the real interest rate is 2.8 percentage points. The money supply increases by only 1.9% over the baseline path in 1986; this is consistent with the slight increase in prices. As noted above, the current account deficit increases by $25 billion in 1986.

Tables 7 and 8 show similar results for Germany and Japan; in both countries fiscal expansion brings output to its potential level with relatively small increases in inflation and interest rates. In 1986, interest rates rise by 0.3 and 0.1 percentage points in Germany and Japan, respectively, and the price level rises by 2.2 and 0.8 percent. Again, these changes are with respect to the baseline path.

The results for the normal growth case are essentially a scaled down version of the peak-to-peak case, although in this scenario most of the expansion occurs in Germany since the baseline case for the U.S. and Japan is fairly close to the normal growth path.

These simulations suggest that there is some scope for coordinated expansion among these three countries. However, it should be understood that behind this relatively optimistic result lies a relatively optimistic set of assumptions. In the MCM, the level of real

output is essentially determined by aggregate demand, along the usual Keynesian lines with adaptive expectations. In these exercises we have assumed part of the answer by specifying that some higher path for output is within the productive capacity of the economy and that factor markets are flexible enough that output could be expanded to meet demand at this level without generating excessive inflation. The model does not provide a framework for evaluating these assumptions, but some judgement must be made about them in evaluating the policy package as a whole.

Table 1

Baseline Assumptions for GNP, Prices, Exchange Rates and Current Accounts

GNP Growth Rates (%)

	U.S.	Japan	Germany
1983	3-1/4	3	1-1/4
1984	5	3-1/2	3
1985	4	3-1/2	3
1986	3-1/2	3-1/2	3

CPI Inflation Rates (%)

1983	4	2	3
1984	5	2	3
1985	5	2-1/2	3
1986	5	2-1/2	3

Exchange Rate Changes (%)

	$/Yen	$/DM
1983	3	-3
1984	10	10
1985	5	5
1986	0	0

Current Account Balances (billions of dollars)

	U.S.	Japan	Germany
1983	-40	20	5
1984	-70	20	8
1985	-70	20	8
1986	-70	20	8

Table 2

Trade and Current Account Balances

U.S. Japan and Germany

(Billions of U.S. dollars, seasonally adjusted annual rates)

	1980	1981	1982	1983 H1	1983 Q1	1983 Q2	1983 Q3
United States							
Trade Balance	25.5	-28.1	-36.4	-46.9	-35.2	-58.6	-71.6
Net Services and Transfers	26.0	32.7	-25.2	20.4	20.9	19.8	
Current Account	0.4	4.6	-11.2	-26.5	-14.3	-38.8	
Japan							
Trade Balance		20.1	18.8	29.2	26.0	32.4	35.2
Net Services and Transfers		-15.3	-11.9	-10.2	-12.0		
Current Account	-10.7	4.8	6.9	19.0	14.0	24.0	24.4
Germany							
Trade Balance		11.9	20.6	19.2	22.4	16.0	
Net Services and Transfers		-4.6	-17.0	-14.2	-15.6	-12.8	
Current Account	-16.5	-7.3	3.6	5.0	6.8	3.2	

Table 3

Nominal Exchange Rates, Relative CPIs and Real Exchange Rates

	Nominal Exchange Rates		Relative CPI's (1978Q4 = 1.0)		Real Exchange Rates (Col. 1 x Col. 2, indexed in 1978Q4 = 1.0)	
	Yen/$	DM/$	US/JAP	US/GER	Yen/$	DM/$
1978Q4	190	1.87	1.00	1.00	1.00	1.00
1979Q4	238	1.76	1.07	1.07	1.35	1.01
1980Q4	210	1.91	1.12	1.15	1.24	1.17
1981Q4	224	2.25	1.18	1.18	1.39	1.42
1982Q4	259	2.50	1.20	1.18	1.64	1.57
1983Q3	249	2.61	1.23	1.18	1.61	1.65
			Percentage Changes			
1979Q4/78Q4	24.9	-5.8	7.5	6.7	34.3	.5
1980Q4/79Q4	-11.6	8.2	4.3	7.5	-7.8	16.3
1981Q4/80Q4	6.6	17.7	5.3	2.9	12.3	21.1
1982Q4/81Q4	15.3	11.3	2.1	-.2	17.7	11.0
1983Q3/82Q4	-3.6	4.2	1.6	0.0	-1.9	4.2
1983Q3/80Q4	18.6	36.6	9.3	2.6	29.6	40.2
1983Q3/78Q4	31.1	39.6	22.6	18.0	60.7	64.7

Table 4

U.S., Japanese and German Exports to Developing Countries

(Billions of dollars, annual rates)

	1978	1979	1980	1981	1982 H1	1982 H2	1983 H1
U.S. Exports							
Total	143.8	182.0	220.8	233.8	224.6	200.0	222.4
To Developing Countries	55.0	66.1	87.0	95.0	92.0	81.8	83.2
To Major Debtor Countries*/	19.7	26.5	35.9	39.1	28.4	34.0	30.6
Japanese Exports							
Total	98.4	102.3	130.4	151.5	140.8	136	138.5
To Developing Countries	59.8	46.9	60.9	70.0	63.6	62.2	61.7
To Major Debtor Countries*/	12.5	11.4	12.1	13.4	11.6	9.8	9.7
German Exports							
Total	142.5	171.8	192.8	176.1	182.6	170.2	173.1
To Developing Countries	33.5	36.4	40.6	42.5	41.6	38.8	36.9
To Major Debtor Countries*/	4.1	5.1	5.9	5.5	4.8	3.8	4.0

*/ Argentine, Brazil, Chile, Korea, Mexico, Peru, Phillippines, Venezuela

Source: IMF Direction of Trade Statistics, (various issues)

Table 5: Potential Output Measures for the MCM Countries

	current output gap (%)		annual growth rate of potential GNP (%)	average annual growth needed to reach potential by 1986	
	peak to peak	normal growth		peak to peak	normal growth
Canada	10.1	6.2	2.9	6.4	5.1
Germany	10.7	5.8	2.7	6.3	4.7
Japan	2.7	-0.1	3.9	4.8	3.9
U.K.	7.2	2.7	1.3	3.6	2.1
U.S.	8.4	3.5	2.9	6.0	4.3

Table 6: High Employment Growth - United States

amounts shown are deviations from the baseline path, annual averages, in percentage terms unless noted.

growth to potential output in 1986

	1983	1984	1985	1986
real GNP	0.1	1.3	3.3	5.6
real government spending	0.2	2.9	8.3	17.0
government deficit ($b)	1.0	7.6	23.7	59.7
price level	-0.0	-0.0	0.1	0.8
interest rate (100 basis points)	0.0	0.4	1.5	3.5
money supply - M1	0.0	0.2	0.8	1.9
exchange rate-foreign currency/$	0.0	0.5	1.6	3.0
real imports	0.1	2.1	6.5	12.4
real exports	0.1	2.0	4.3	6.3
trade balance ($b)	-0.1	-2.5	-11.1	-26.7
current account balance ($b)	0.1	-0.1	-7.3	-25.0

growth to normal output in 1986

	1983	1984	1985	1986
real GNP	-0.0	-0.1	0.2	0.8
real government spending	-0.2	-0.9	-0.8	0.4
government deficit ($b)	-0.9	-6.0	-8.2	-8.0
price level	0.0	0.0	0.0	0.0
interest rate (100 basis points)	-0.0	-0.0	-0.0	0.3
money supply - M1	-0.0	-0.0	-0.0	0.1
exchange rate-foreign currency/$	-0.0	-0.0	0.1	0.7
real imports	-0.1	-0.7	-0.6	0.8
real exports	0.0	0.6	1.5	2.3
trade balance	0.3	3.1	5.0	2.9
current account balance	0.4	4.9	9.3	9.0

Table 7: High Employment Growth - Germany

amounts shown are deviations from the baseline path, annual averages, in percentage terms unless noted.

growth to potential output in 1986

	1983	1984	1985	1986
real GNP	0.2	2.8	6.1	9.6
real government spending	0.8	7.7	12.7	16.8
government deficit ($b)	-0.6	-2.7	4.5	15.3
price level	0.0	0.2	0.9	2.2
interest rate (100 basis points)	0.0	0.1	0.2	0.3
central bank money	0.0	0.5	1.5	2.9
exchange rate - $/DM (%)	-0.0	-0.6	-1.8	-3.6
real imports	0.2	2.9	6.3	9.8
real exports	0.1	1.6	4.0	6.6
trade balance ($b)	-0.2	-2.6	-5.5	-8.0
current account balance ($b)	-0.2	-3.7	-7.9	-11.4

growth to normal output in 1986

	1983	1984	1985	1986
real GNP	0.1	1.4	3.1	4.9
real government spending	0.4	4.9	8.6	11.7
government deficit ($b)	-0.4	-2.8	-1.3	1.8
price level	0.0	0.1	0.4	1.0
interest rate (100 basis points)	0.0	0.0	0.1	0.2
central bank money	0.0	0.2	0.7	1.4
exchange rate - $/DM (%)	0.0	0.0	-0.3	-1.1
real imports	0.1	1.6	3.5	5.4
real exports	0.0	0.2	0.7	1.5
trade balance ($b)	-0.2	-2.4	-5.3	-8.1
current account balance ($b)	-0.2	-3.2	-7.4	-11.5

Table 8 High Employment Growth - Japan

amounts shown are deviations from the baseline path, annual averages, in percentage terms unless noted.

growth to potential output in 1986

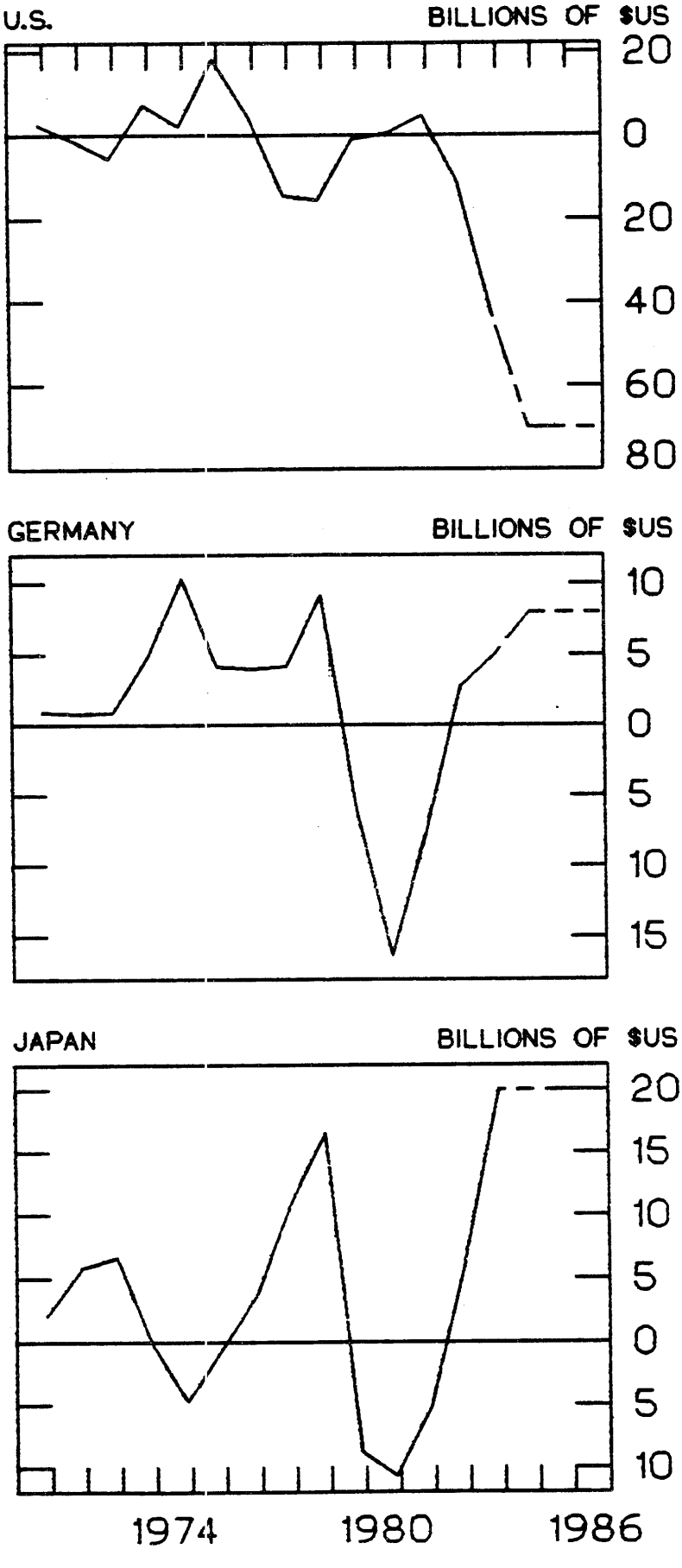
	1983	1984	1985	1986
real GNP	0.1	1.1	2.3	3.6
real government spending	0.5	2.4	-1.2	-11.7
government deficit ($b)	0.2	-1.1	-10.2	-30.2
price level	0.0	0.1	0.4	0.8
interest rate (100 basis points)	0.0	0.0	0.1	0.1
money supply - M2	0.0	0.5	1.0	1.6
exchange rate - $/Yen (%)	-0.0	-0.5	-1.4	-2.4
real imports	0.1	1.2	2.4	3.6
real exports	0.2	3.8	8.8	14.6
trade balance ($b)	0.2	4.4	11.3	21.3
current account balance ($b)	0.3	5.5	16.0	34.7

growth to normal output in 1986

	1983	1984	1985	1986
real GNP	0.0	0.3	0.7	1.1
real government spending	0.3	2.0	2.0	0.2
government deficit ($b)	0.2	1.0	-0.1	-3.9
price level	0.0	0.0	0.1	0.2
interest rate (100 basis points)	0.0	0.0	0.0	0.0
money supply - M2	0.0	0.2	0.3	0.5
exchange rate - $/Yen (%)	0.0	0.0	-0.1	-0.4
real imports	0.0	0.4	0.8	1.2
real exports	0.0	0.5	1.7	3.3
trade balance ($b)	-0.0	0.4	1.8	4.3
current account balance ($b)	-0.0	0.5	2.4	6.4

Figure 1

CURRENT ACCOUNT BALANCE



LEGEND

———— = HISTORICAL CURRENT ACCOUNT

— - — - = BASELINE PROJECTION

Figure 2

POTENTIAL GNP

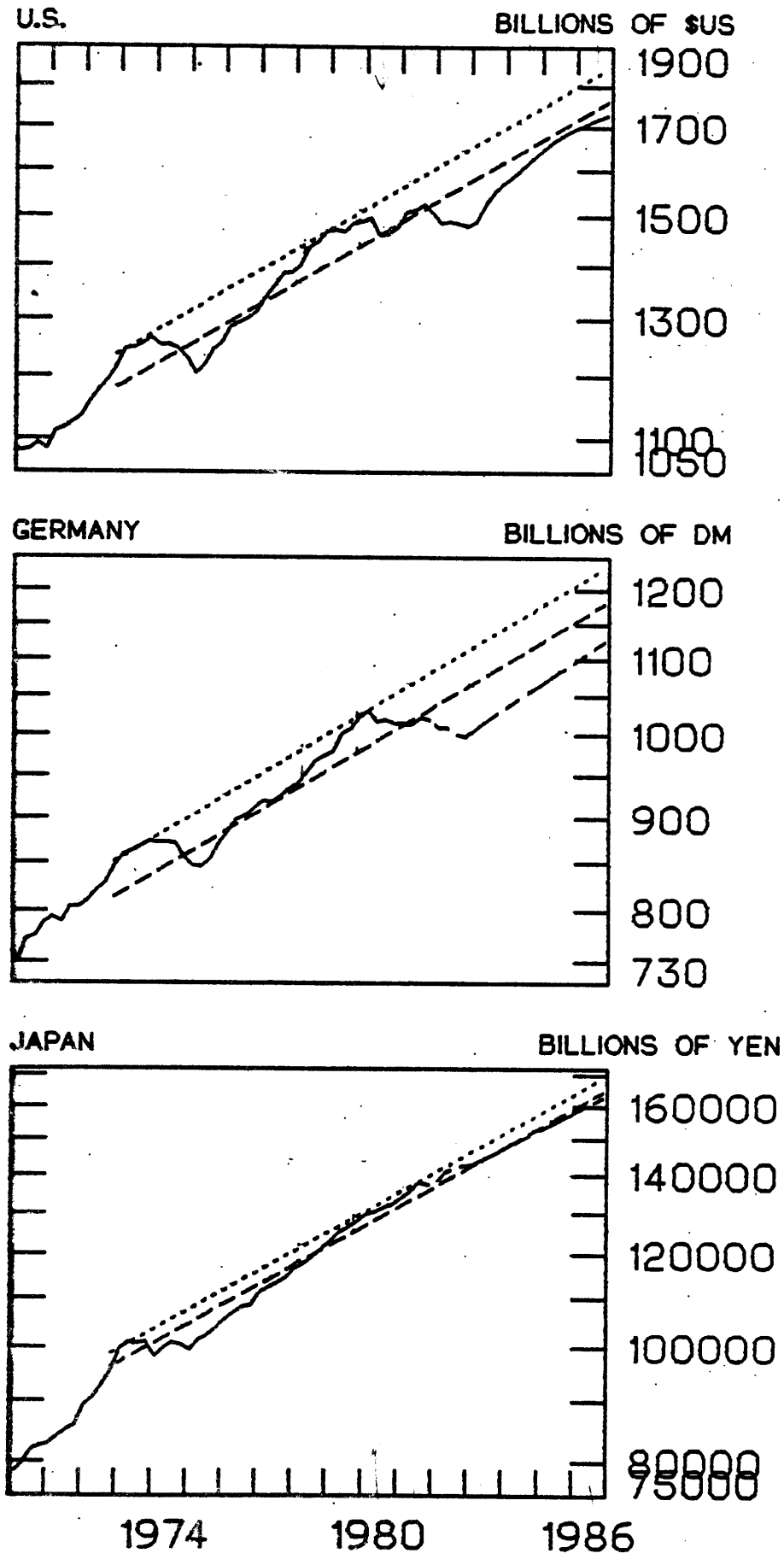
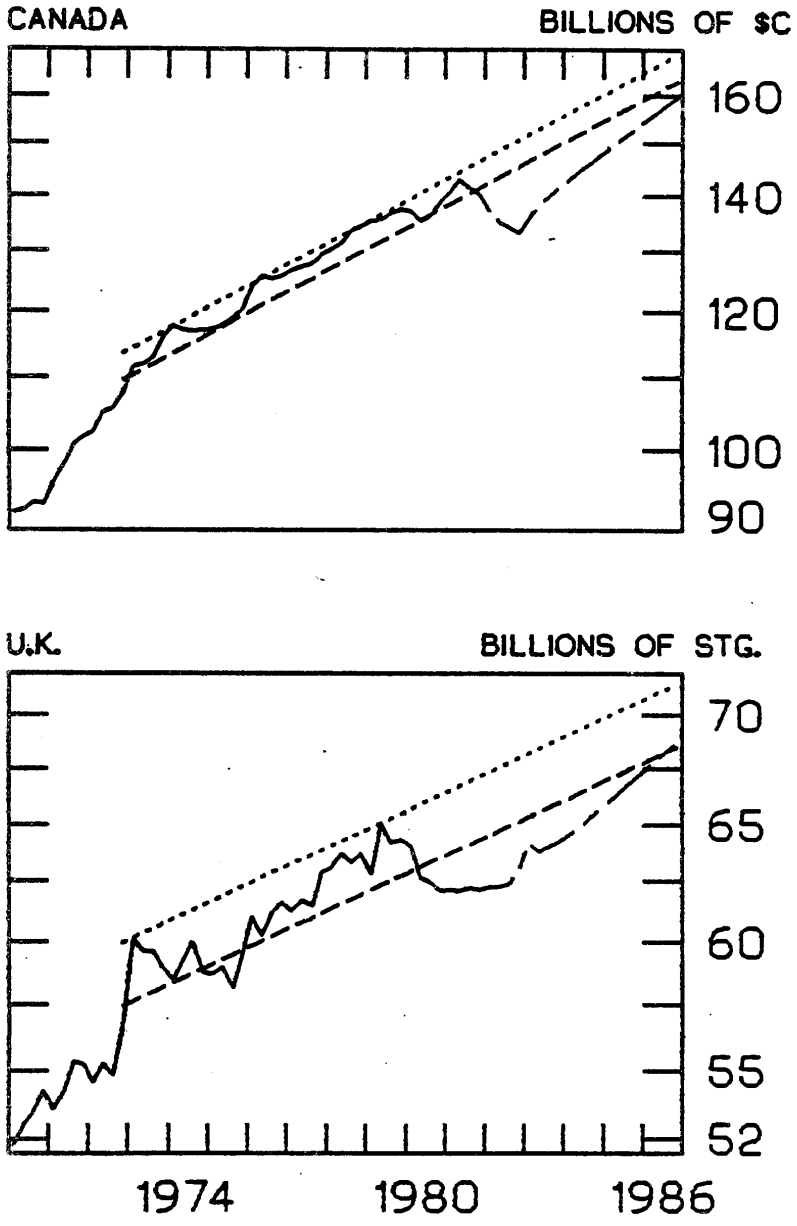


Figure 3

POTENTIAL GNP



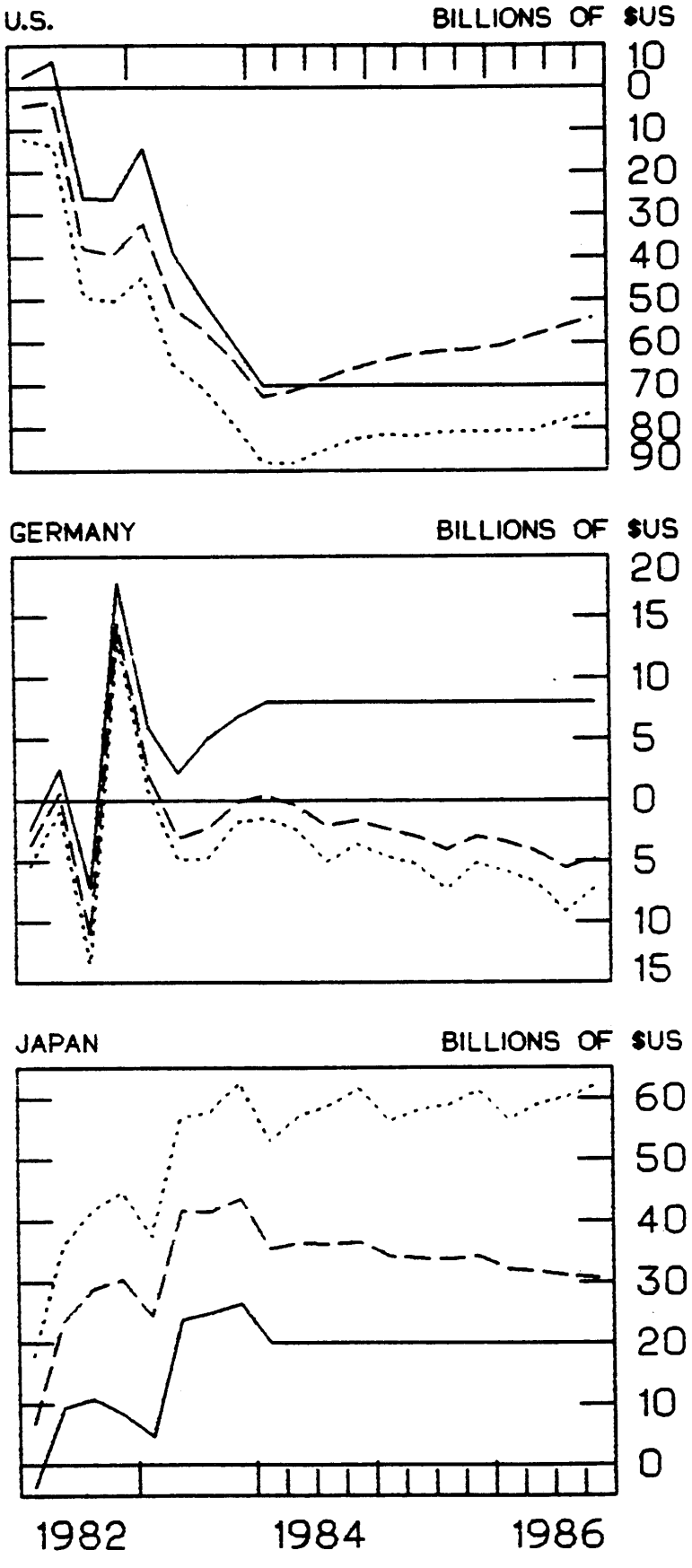
LEGEND

——— = HISTORICAL GNP
— - — - = BASELINE FORECAST
..... = PEAK-TO-PEAK POTENTIAL GNP
– – – – = NORMAL GNP

Figure 4

CURRENT ACCOUNTS: ALTERNATIVE OUTPUT PATHS

PARTIAL EQUILIBRIUM ANALYSIS



LEGEND

_____ = BASELINE PATH

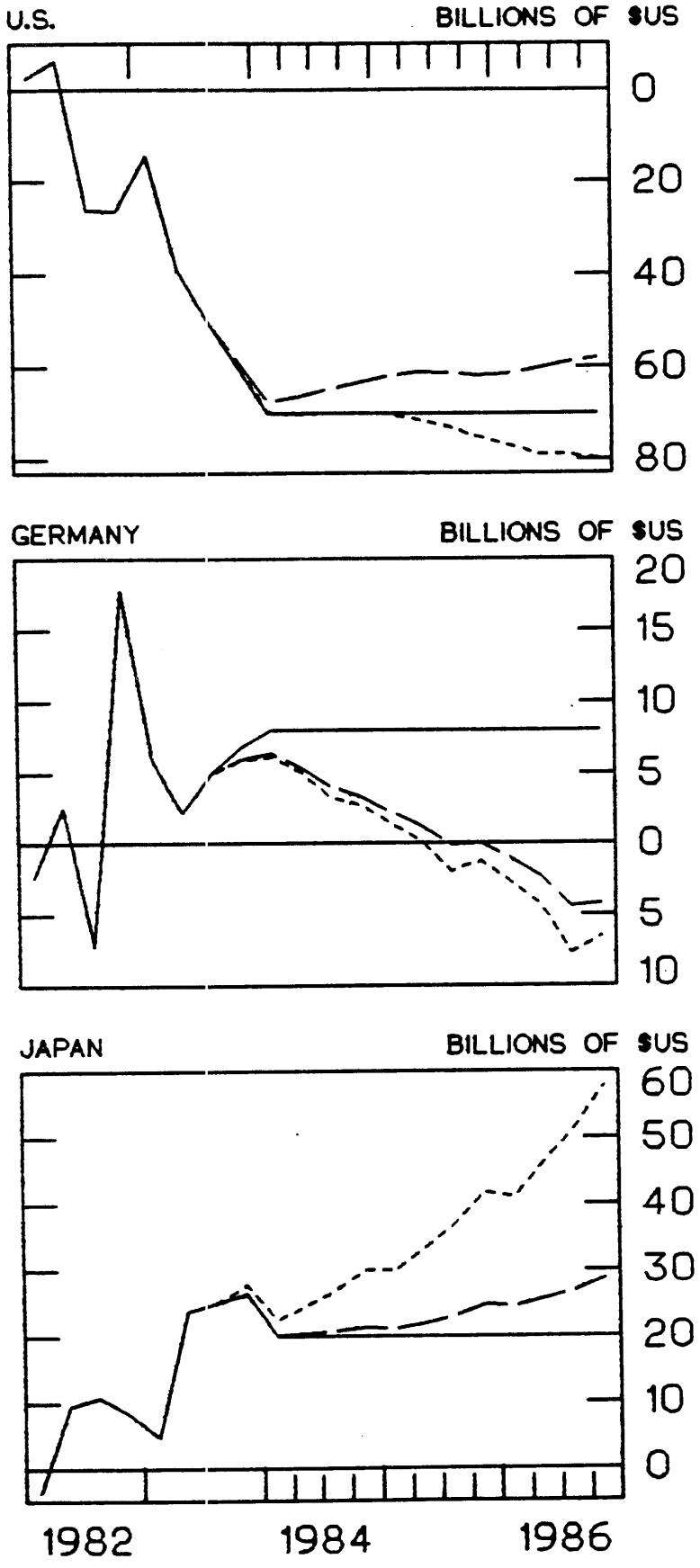
..... = AT POTENTIAL OUTPUT FROM 82Q1 ON

– – – – – = AT NORMAL OUTPUT FROM 82Q1 ON

Figure 5

CURRENT ACCOUNTS: ALTERNATIVE OUTPUT PATHS

PARTIAL EQUILIBRIUM ANALYSIS



LEGEND

———— = BASELINE PATH

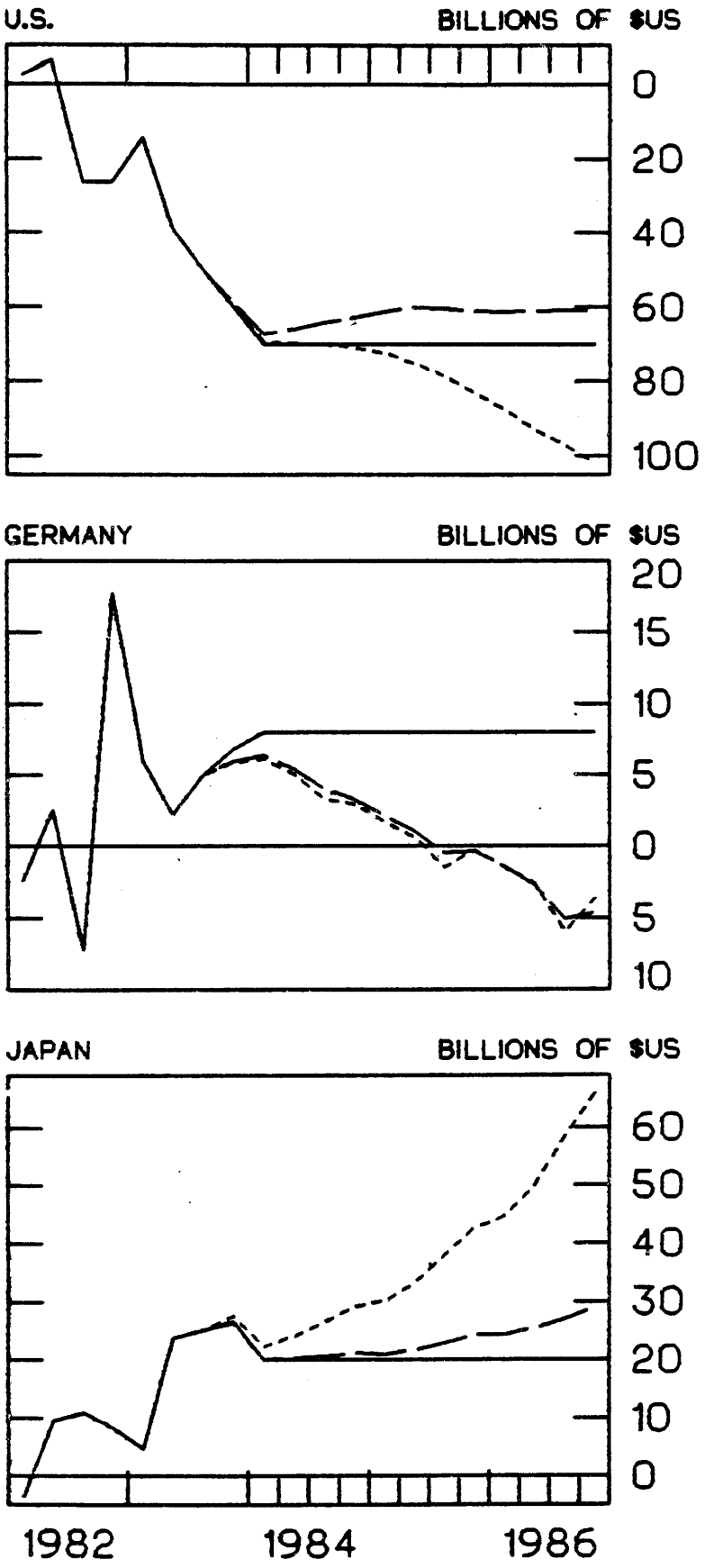
---------- = REACH POTENTIAL OUTPUT IN 86Q4

— — — = REACH NORMAL OUTPUT IN 86Q4

Figure 6

CURRENT ACCOUNTS: ALTERNATIVE OUTPUT PATHS

FULL MCM ANALYSIS



LEGEND

———— BASELINE PATH

---------- REACH POTENTIAL OUTPUT IN 86Q4

— — — REACH NORMAL OUTPUT IN 86Q4

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Footnotes

*/ Economists, Federal Reserve Board. This paper initially was prepared for presentation at the Fourth International Workshop of the Applied Econometric Society, Brussels, Belgium, December 8-9, 1983. The views presented here are the authors' and do not necessarily represent the views of the Board of Governors of the Federal Reserve System or anyone else on its staff. We have benefitted from discussions with William L. Helkie, Karen Johnson, Ray Lubitz and Jaime Marquez, and especially Dale W. Henderson and Steven Symansky. We also thank Edwin M. Truman for his comments on an earlier draft, and we are grateful to Caryl McNeilly, Sarah Lee and John E. Keniley for their able research assistance.

1/ An analogous methodology is used in the computation of cyclically-adjusted budget deficits. See, for example, deLeeuw and Holloway (1983).

2/ Klein (1983) makes a similar point with respect to the calculation of full-employment or structural budget deficits.

3/ The MCM is described in detail in Stevens, et. al. (1983) and Federal Reserve Board (1983).

4/ The prototype exchange rate equation employed in this paper is written:

$$\log(iER) = \log(iP/UP) + \log[(1 + URS)/(1 + iRS)] + \log[(1 + i\pi)/(1 + U\pi)] + Resid$$

where:

iER = Exchange rate (country i's currency/dollar).
iP = Country i's consumer price index.
iRS = Country i's short-term (3-month) interest rate.
$i\pi$ = Country i's CPI annual inflation rate over the past six quarters.
Resid = residual
where i = Japan, Germany, Canada and the U.K.; variables preceded by "U" denote U.S. variables.

Note that the second and third right-hand-side terms combined represent an estimate of the short-term real interest differential.

5/ Blue Chip Economic Worldscan, P.J. Eggert, ed. Capitol Publication Inc., Arlington Va., October 15 and November 15, 1983.

6/ OECD Economic Outlook, July 1983, p. 60.

7/ Analytical Appendix to Structural Budget Deficits and Fiscal Policy Responses to the Recession, OECD Secretariat, CPE/WP1(83) 2

8/ This treatment of developing countries, and debtor countries in particular, implicitly assumes that adjustments to lower import levels necessitated by debt servicing are fully accounted for in the baseline, and that these countries' imports would expand in line with their export revenues if industrial countries grew faster.

9/ The income elasticities of U.S. imports from other regions in the MCM range between 1.5 and 2.0, while the elasticities of other countries' demand for U.S. goods range between 1.0 and 1.5. These elasticities generally were estimated over the period 1967-1980.

10/ The longer-run impact on the Japanese current account is probably overstated by about $10 billion in this simulation (and by 1986 in all of the forward-looking peak-to-peak simulations discussed below) because of an implausibly high parameter that leads to a longer-run instability in the Japanese service account sector.

11/ Japanese interest rates rise little because they are essentially pegged to the official discount rate. German rates rise much less than U.S. rates because the interest elasticity of money demand is substantially higher in the German model than the U.S. model. A recently updated version of the U.S. monetary sector, which was not completed in time for these simulations, would have yielded a noticeably smaller impact on U.S. interest rates.

12/ In the simulations, Canada and the U.K., as well as the rest-of-world sector, were assumed to be expanding towards potential or normal output.