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MACROECONOMIC POLICIES, COMPETITIVENESS, AND U.S. EXTERNAL ADJUSTMENT

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ABSTRACT

This paper presents an empirical analysis of the relationships among the U.S. external balance, exchange rates, macroeconomic policies, and longer-term trends in relative labor productivity. Movements in the U.S. external balance over the past two decades have been determined to a substantial degree by shifts in U.S. international price and cost competitiveness. Movements in price and cost competitiveness, in turn, have been dominated by swings in nominal exchange rates, which can be explained to a large extent by shifts in fiscal and monetary policies at home and abroad. A longer-term downward trend in the dollar may have been associated with secular decline in U.S. relative to foreign productivity in manufacturing. The downtrend in relative productivity has leveled off in recent years, however. The likelihood of a resumption of the downtrend in relative productivity may be reduced, at current levels of exchange rates, by a shift in manufacturing investment towards the United States.

Macroeconomic Policies, Competitiveness, and U.S. External Adjustment

Peter Hooper[1]

I. Introduction and Summary.

The sharp decline in the U.S. external balance during the 1980s represents the acceleration of a downward trend that began three decades earlier. After being comfortably in surplus during the 1960s, the U.S. current account was about in balance, on average, during the 1970s, and fell steeply into deficit during the 1980s. Some analysts have suggested that this downward trend reflects a secular decline in U.S. international competitiveness, due in good measure to a deterioration in the relative performance of U.S. labor productivity in manufacturing. These trends in competitiveness and relative labor productivity, in turn, are viewed as having decidedly negative implications for the dollar's exchange rate in the longer run. With the dollar now back to where it was at the end of the 1970s, and the current account still substantially in deficit, many observers feel that significant further depreciation is inevitable.

This paper comes to a somewhat less negative conclusion about the prospects for U.S. external adjustment and the dollar, based on an analysis of past movements in the external balance, competitiveness,

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1. Assistant Director, Division of International Finance, Federal Reserve Board, and was a guest scholar at the Brookings Institution when this paper was written. The paper was prepared for an SSCR conference on "International Productivity and Competitiveness," Stanford, California, October 28-30, 1988, and is forthcoming in a conference volume edited by Bert G. Hickman. I wish to thank Bert G. Hickman, Ronald I. McKinnon, and Sean Craig for their comments on an earlier draft, and Kathryn A. Larin for her research assistance. The views expressed in this paper are my own, and do not necessarily reflect the views of the Federal Reserve Board, the Brookings Institution, or other members of their staffs.

productivity, and macroeconomic policies. Much of the earlier downtrend in the U.S. nominal external balance was the result of adverse movements in the U.S. terms of trade, as oil prices soared and the dollar fell. In real terms, the external balance actually showed a significant uptrend during the 1970s. Changes in price and cost competitiveness, as well as swings in relative aggregate demand, are shown to have had major impacts on the real external balance over the past two decades. During the 1970s, the effects of shifts in competitiveness were largely positive, despite a substantially lower rate of growth in U.S. labor productivity in manufacturing than abroad. The decline in U.S. relative productivity was more than offset by a decline in U.S. relative nominal wages. As a result, U.S. international competitiveness in terms of relative unit labor costs in manufacturing rose strongly, and contributed to the rise in real net exports during that period.

These positive trends were reversed in the first half of the 1980s, as U.S. price competitiveness and the external balance turned sharply downward. This decline in U.S. competitiveness occurred despite an improvement (or at least a leveling-off of the downward trend) in U.S. relative productivity in manufacturing. Over most of the floating exchange rate period, movements in U.S. price and cost competitiveness have been influenced predominantly by swings in nominal exchange rates, which in turn, largely reflect the effects of shifts in macroeconomic policies at home and abroad.

Looking ahead, this analysis has mixed implications for the dollar and external adjustment. On the one hand, the effectiveness of macroeconomic policies designed to reduce the external deficit in the short to medium term will be enhanced to the extent that they increase

U.S. price competitiveness by lowering the dollar. On the other hand, a lower dollar would be counterproductive unless domestic demand is restrained enough or output capacity is expanded enough to accommodate a further expansion of net exports.

In any case, exchange rates may already be at a level that could contribute to an eventual upturn in U.S. manufacturing productivity relative to that in other industrial countries. By some estimates, labor costs are now far enough below those in many other countries to make the United States a relatively attractive place to invest in manufacturing capacity, ceteris paribus. Such a shift in output capacity would tend to raise U.S. relative productivity. In the longer-run this development would tend to ease downward pressure on the dollar, while contributing to a further narrowing of the external deficit. Of course, the effectiveness of adjustment through such shifts in output capacity will be enhanced to the extent that U.S. macroeconomic policies restrain government and private consumption and facilitate investment, particularly in the manufacturing sector.

The paper begins with a review of longer-term trends in the U.S. external position, competitiveness, and the relationship between the two, in Section II. The next section analyzes trends in relative labor costs in manufacturing in the United States and other major countries as a fundamental indicator of U.S. competitiveness, focusing in particular on the contributions of underlying movements in productivity and exchange rates. The linkage between exchange rates and macroeconomic policies is discussed in Section IV, followed by an assessment of the implications of swings in exchange rates for longer-term trends in productivity and external adjustment in Section V.

II. Trends in the U.S. External Balance and its Determinants.

The sharp decline in the U.S. external balance during the 1980s was preceded by lesser declines over the preceding two decades. As indicated by the solid line in the top panel of Chart 1, the current account balance expressed as a percentage of nominal GNP was consistently positive during the 1960s (averaging +0.5%). The ratio fluctuated during the 1970s, but fell to an average of 0.0% for the decade. During the first 8-1/2 years of the 1980s, the ratio plunged to an average of -1.7%. The decline in the external balance between the 1960s and the 1970s occurred despite a substantial depreciation of the dollar over that period. This development has been interpreted by Krugman and Baldwin (1987), among others, as indicative of an underlying secular decline in the competitiveness of the U.S. manufacturing sector associated with a significant shortfall in the growth of U.S. labor productivity relative to that abroad.[2] In this view it was not at all surprising that the external deficit should turn sharply negative during the 1980s when a significant rise in the dollar augmented the secular decline in U.S. competitiveness.

However, a closer look at the external deficit suggests that much of the earlier downtrend in the nominal balance was due to adverse movements in the terms of trade. As shown in the bottom panel, the terms of trade fell sharply during the 1970s, as import prices rose and as the dollar fell. (The contribution of the rise in oil prices can be seen in the difference between the two lines in that panel.) Expressed in real terms, the external balance fluctuated widely, but showed no discernable trend over the past three decades (as indicated by the dashed line in the

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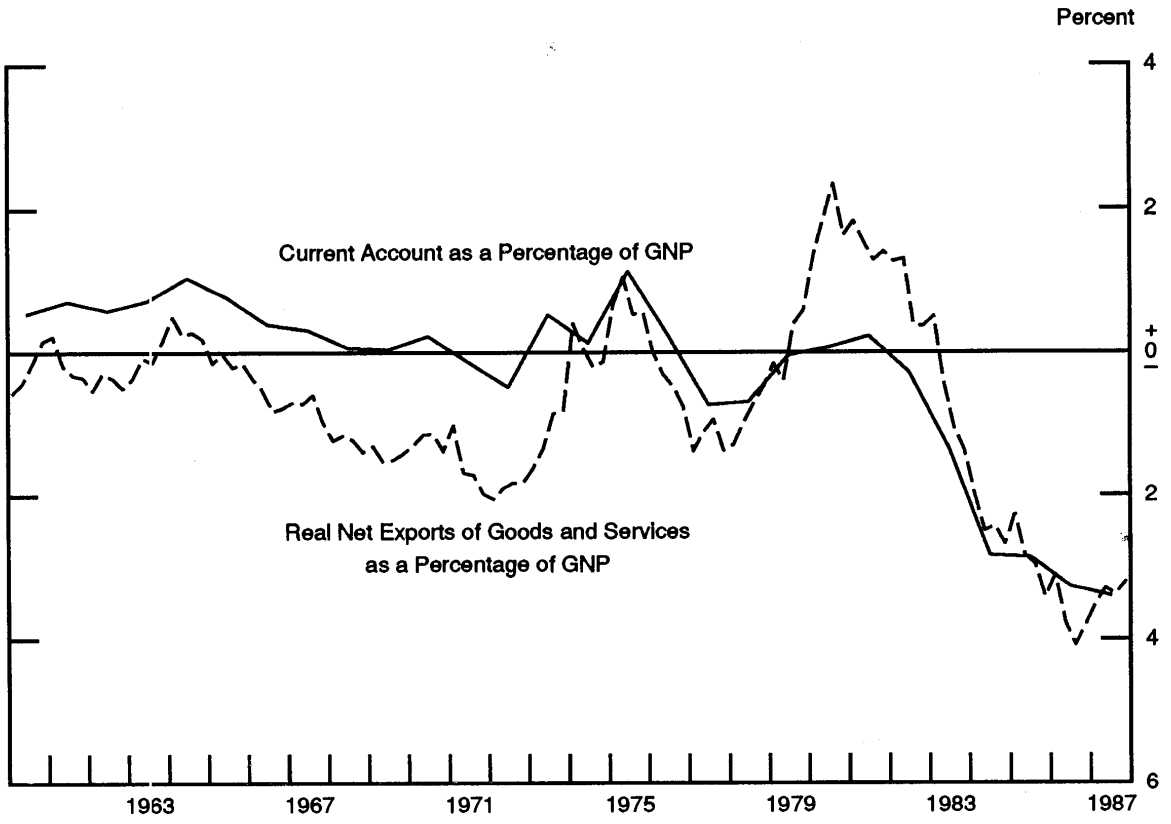
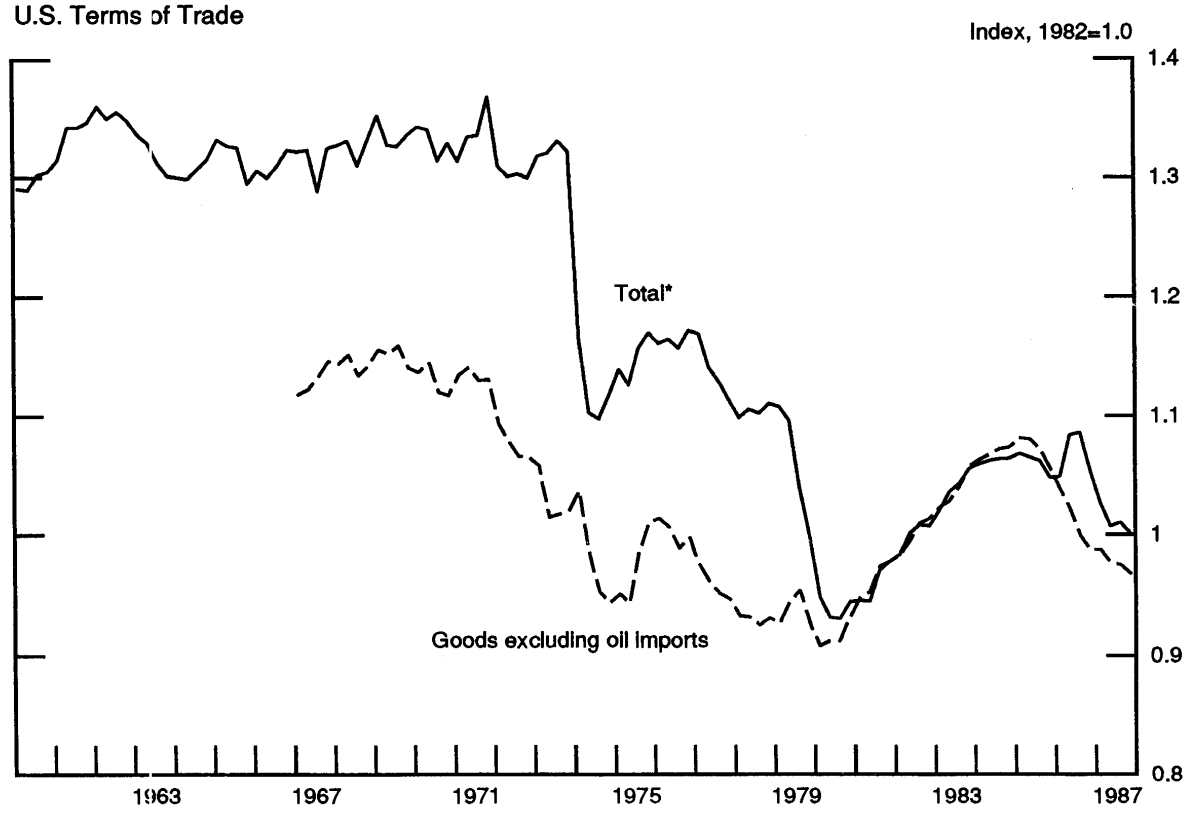
2. See Krugman and Baldwin (1987) pp. 34-36.

Chart 1

U.S. External Balances



U.S. Terms of Trade



* GNP deflator for exports of goods and services divided by the GNP deflator for imports of goods and services

top panel of Chart 1). Indeed, between 1970 and 1980 real net exports as a percent of real GNP actually rose strongly.[3]

Over the past two decades, movements in real net exports have been closely associated with swings in relative domestic activity and competitiveness. Chart 2 shows a comparison of real net exports with various measures of relative real activity (in the top panel) and relative prices and costs (in the bottom panel).[4] The two measures of relative activity in the top panel are the ratios of foreign to U.S. real GNP and real domestic expenditures (C+I+G).[5] In the early 1970s and again in the late 1970s, significant increases in real net exports coincided with substantial increases in the activity ratios, as U.S. growth fell short of growth abroad. The reversal of the activity ratios as U.S. growth accelerated after 1982 contributed to the decline in real net exports over that period.[6]

The measures of competitiveness shown in the bottom panel are the ratios of foreign to U.S. consumer prices in dollars and the ratio of

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3. Most of the rise in real net exports of goods and services during this period reflected an increase in the volume of nonagricultural exports relative to the volume of non-oil imports.

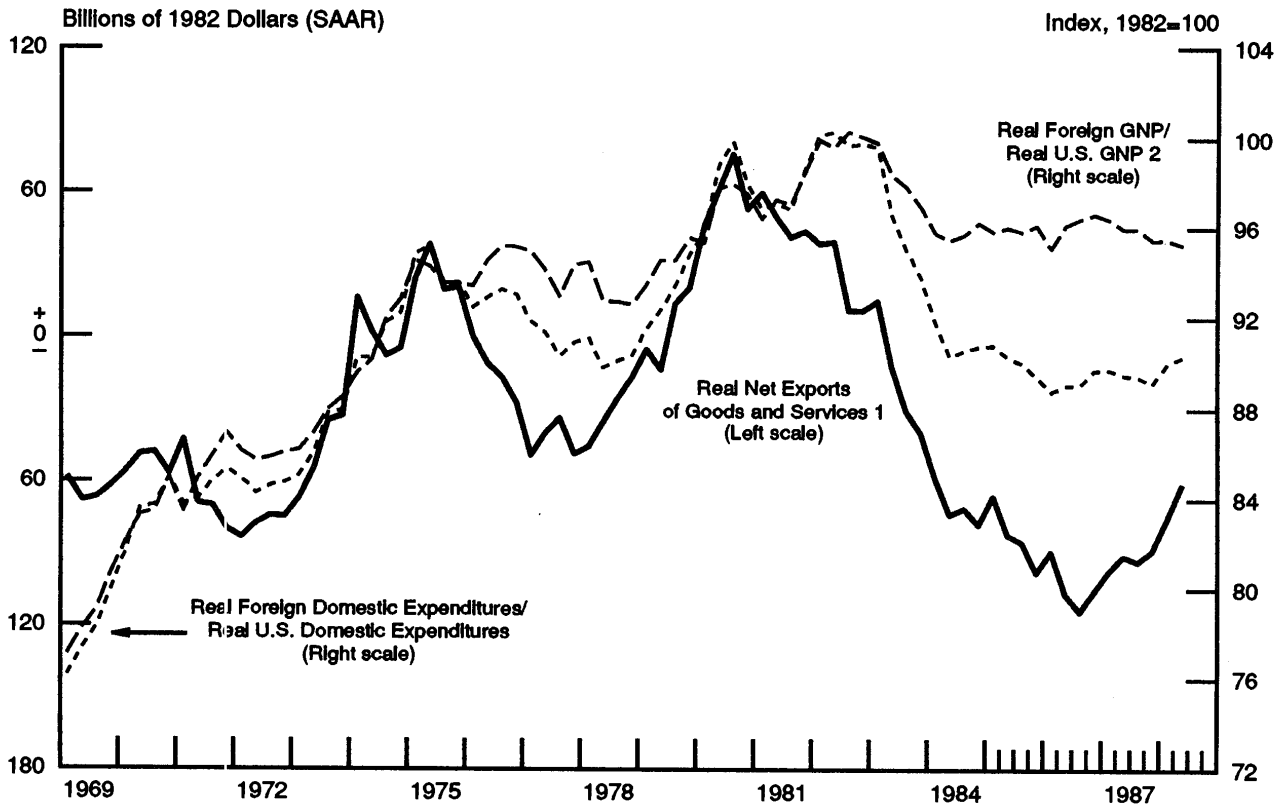
3. Net exports have been normalized by trend growth in total U.S. real trade over the period 1969-87 in order to make them more comparable with the other series shown over the entire period covered. Between 1969 and 1987, total U.S. trade increased by about 250 percent in real terms. Without scaling for this trend growth, a given percentage change in relative activity or relative prices would be associated with a substantially greater change in net exports at the end of the period shown than it would be at the beginning.

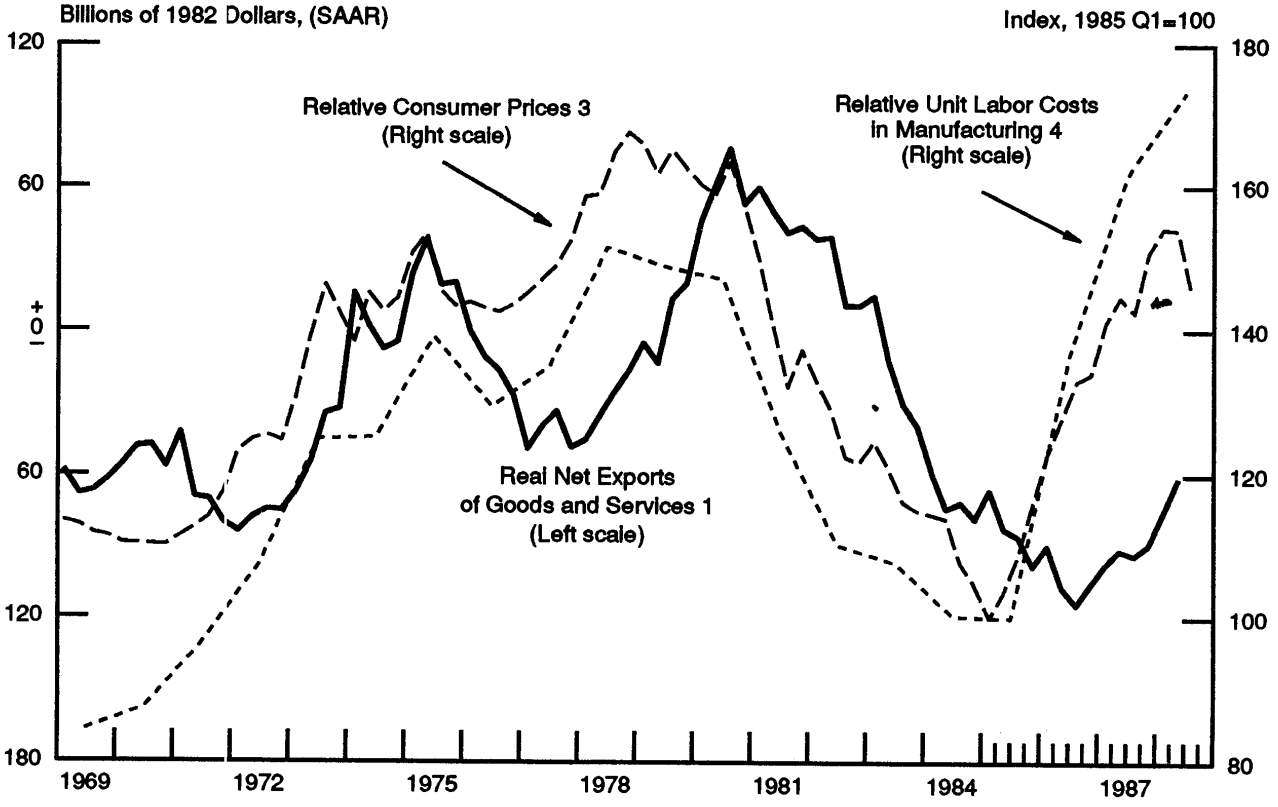
5. Foreign domestic expenditures were not measured directly, but were approximated by adding U.S. net exports to aggregate rest- of-world GNP.

6. The simple correlation between the GNP ratio and net exports over the period shown is .35, while that between the domestic expenditure ratio and net exports is .70. A higher correlation can be expected in the second case because net exports are incluede in domestic expenditures but not in GNP. In econometric tests with both GNP and domestic expenditures in separate behavioral equations for imports and exports, Hooper and Mann (1989) found relatively little difference in the "explanatory power" of these two activity variables.

Chart 2

Determinants of U.S. Real Net Exports of Goods and Services





Source : Federal Reserve Board USIT model database.

1. Adjusted for trend growth in U.S. trade volume between 1969 and 1987.
2. Foreign GNP includes all OECD countries, OPEC and non-OPEC developing countries.
3. Ratio of consumer prices in 10 industrial countries and 8 developing countries (in dollars) to U.S. consumer prices. Foreign prices are weighted by multilateral trade shares.
4. Ratio of manufacturing unit labor costs in dollars in 8 industrial countries (weighted by shares in world GNP) to U.S. manufacturing unit labor costs.

foreign to U.S. unit labor costs in dollars.[7] The chart indicates that increases in real net exports during both 1972-75 and 1978-80 followed significant increases in these measures of U.S. international price competitiveness, with a lag of about one to two years. The decline in net exports after 1980 followed a dramatic decline in price competitiveness that had peaked about a year and a half earlier. More recently, the trough in real net exports in the third quarter of 1986 followed by a year and a half after the peak in the dollar and the low point in U.S. price competitiveness. (The correlation between net exports and relative consumer prices with a five-quarter lag over the entire period shown is .83, while that between annual observations of real net exports and relative unit labor costs with a one-year lag is .64.) A comparison of the top and bottom panels of the chart suggests that the expansion of net exports during 1987-88 was due primarily to the recovery of U.S. competitiveness that began in 1985.

Several recent empirical studies have attempted to quantify the contributions of movements in activity and relative prices to the widening of the U.S. real net export deficit between 1980 and 1986, based on simulations with partial-equilibrium models of the U.S. current account.[8] The consensus seems to be that the more rapid expansion of income and domestic demand in the United States than abroad accounted for between 1/4 and 1/3 of the total widening of the deficit, while the decline in U.S. price competitiveness associated with the rise in the dollar accounted for between 1/2 and 3/4 of the total.

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7. The ratio of unit labor costs used is described more fully below.
8. See Helkie and Hooper (1988), Hooper and Mann (1989), and Krugman and Baldwin (1987).

III. Exchange Rates, Productivity, and Competitiveness

This section analyzes the relative levels of and movements in U.S. and foreign unit labor costs in manufacturing, an important indicator of U.S. international competitiveness.[9]

Table 1 presents the components of the levels of unit labor costs in manufacturing in the United States, in a group of 8 other industrial countries.[10] The top panel shows hourly compensation in dollars, where local-currency compensation for foreign countries is translated into dollars at current nominal exchange rates.[11] In 1980, hourly compensation in U.S. manufacturing, at roughly $10 per hour, was slightly above that in other major industrial countries on average. By 1985, the difference had risen significantly, to more than $5 per hour, reflecting the sharp appreciation of the dollar over that period. After 1985, with the fall in the dollar, U.S. compensation fell substantially relative to that abroad. At average exchange rates for the first three quarters of 1988 the U.S. level was estimated to be slightly below that in other industrial countries, on average.

The middle panel of the table presents estimates of levels of labor productivity in manufacturing, expressed as output per hour measured in 1980 dollars. Foreign productivity data, measured in constant (1980) local currency units, have been translated into 1980 dollars with 1980 purchasing power parity exchange rates specific to

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9. The data presented in this section are described more fully in Hooper and Larin (1988).
10. A more complete assessment of changes in U.S. international cost competitiveness would also have to take into account data for a number of important developing countries. Data on these countries are much less readily aveilable, however.
11. These data are compiled by the Bureau of Labor Statistics.

Table 1

Comparative Levels of Hourly Compensation,
Productivity, and Unit Labor Costs in Manufacturing

	1960	1965	1970	1975	1980	1985	1987	1988[P1]	1988[P2]
Total Compensation per hour (current dollars)									
United States	2.6	3.1	4.2	6.4	9.8	13.0	13.5	14.2	14.2
Foreign Industrial Countries*	0.6	1.0	1.6	4.5	8.4	7.7	12.8	14.6	13.5
Output per hour (1980 dollars)									
United States	9.2	11.3	11.9	13.7	15.0	18.4	19.9	20.3	20.3
Foreign Industrial Countries*	3.4	4.6	6.8	8.8	11.0	13.9	14.7	15.1	15.1
Unit Labor Costs (Ratio of compensation/hr to output/hr)									
United States	29	28	35	46	66	71	68	70	70
Foreign Industrial Countries*	18	21	24	51	76	55	87	94	89

P1/ Projections, based on exchange rates for January-September 1988, and projection of recent compensation and productivity trends.

P2/ Projections based on exchange rates for 1988 Q3..

*/ Canada, Japan, Germany, France, the United Kingdom, Italy, Belgium, the Netherlands, Denmark and Norway; weighted by shares in world GNP.

manufacturing.[12] The productivity estimates suggest that U.S. productivity remains well above that in other countries, although the gap has narrowed substantially over the past three decades.

The bottom panel shows the ratios of compensation to productivity, or estimates of unit labor costs. These estimates suggest that average manufacturing labor costs in other industrial countries were nearly 40 percent above the U.S. level at average exchange rates over the three quarters of 1988.

Movements over time in the ratios of U.S. unit labor costs and its components to those in other industrial countries can be seen more clearly in Chart 3. As shown in the top panel, U.S. productivity relative to foreign productivity (the long-dash line) fell substantially during the 1960s and early 1970s. However, U.S. compensation relative to foreign compensation (in dollars) fell even faster, resulting in a net gain in U.S. cost competitiveness (as indicated by the decline in relative unit labor costs shown in the bottom panel). During the 1960s, most of this gain in U.S. cost competitiveness was due to relatively faster domestic wage inflation abroad (in local currencies), as dollar's average nominal exchange rate was fairly stable (bottom panel). From the early 1970s on, however, most of the variance in relative unit labor costs was attributed to movements in nominal (and real) exchange rates, as domestic inflation rates in the United States and other industrial countries, on average, have converged.[13]

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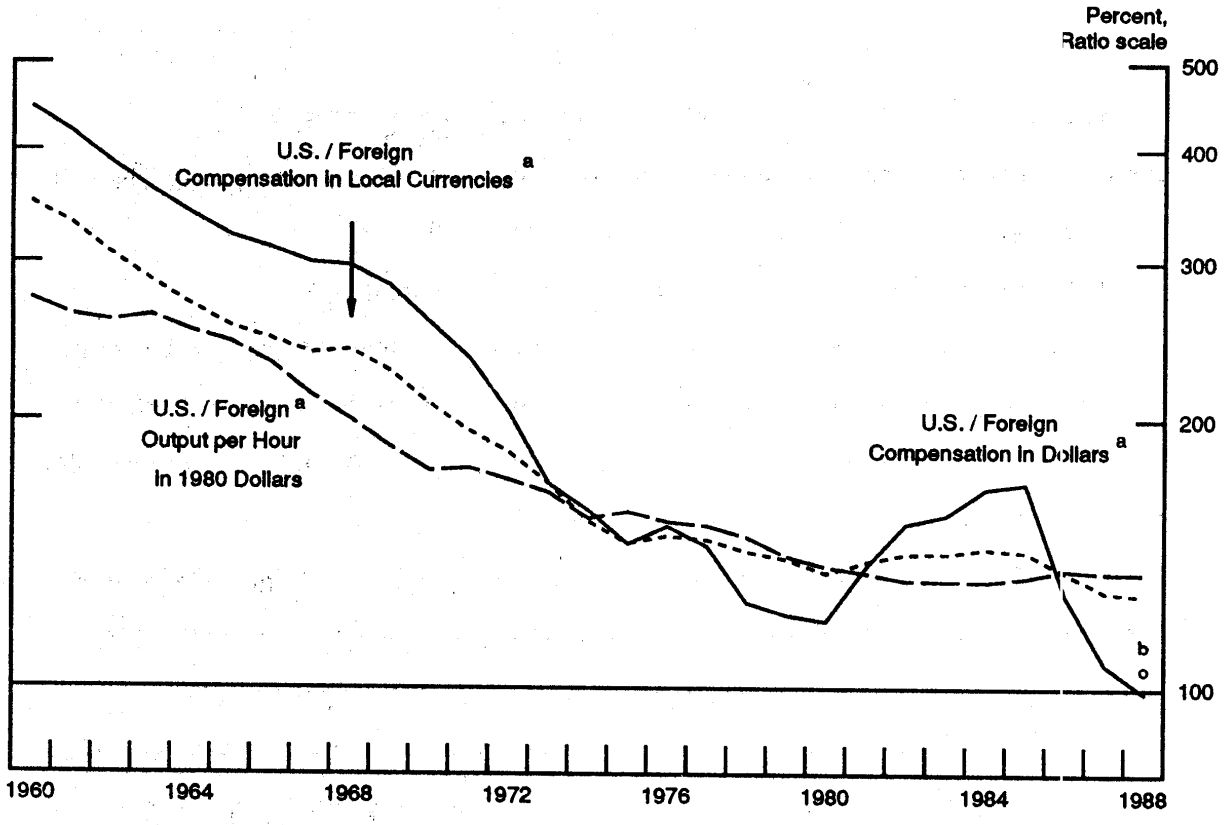
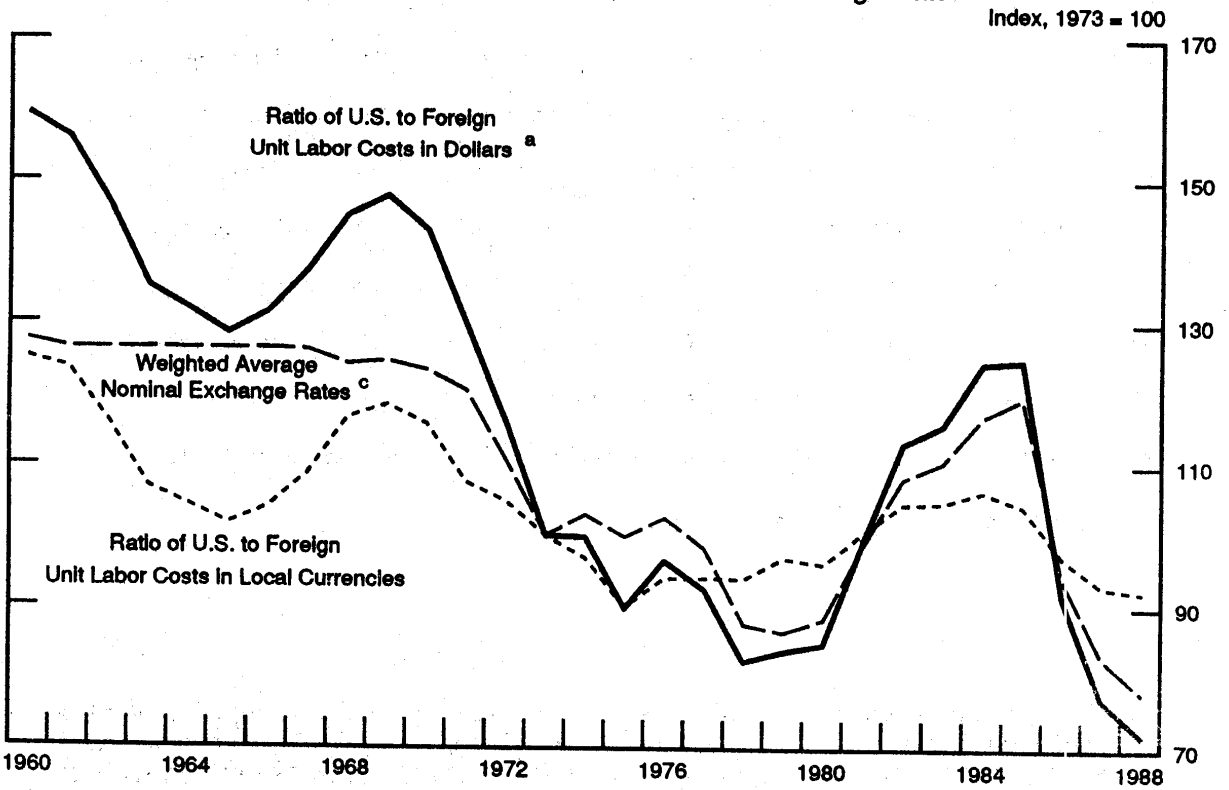
12. The PPP exchange rates are constructed from purchasing power parities for individual expenditure categories, compiled by the U.N. International Comparison Project. The movements in relative productivity over time are based on BLS estimates. See Hooper and Larin (1988).
13. The simple correlation between quarterly movements in the exchange rate and the unit labor cost ratio between 1972 and 1988 is 0.95.

Chart 3

Relative Unit Labor Costs in Manufacturing and Their Components



Relative Unit Labor Costs and the Nominal Exchange Rate



a. Foreign includes average of Japan, Germany, France, Canada, the United Kingdom, Italy, the Netherlands, and Belgium, in dollars, weighted by manufacturing output.

b. Estimate based on levels of nominal exchange rates in 1988 Q3. Chart plotted using average exchange rate for 1988 Q1-Q3.

c. Weighted by shares in world GNP.

IV. Macro Policies and Exchange Rates

In this section we first review a key component of the link between macro policies and the exchange rate -- real interest parity. We then review empirical evidence on the effects of shifts in macro policies on real interest rates and exchange rates

A. Real Interest Parity.

Long-term real open interest parity has held up as well as any empirical relationship in explaining movements in the dollar over the floating-rate period. In essence, this model equates the long-run expected change in the real exchange rate with the long-term real interest rate differential.[14] The basic assumptions of the model are first, that assets denominated in different currencies are highly substitutable, second, that a expectations about the equilibrium level of the real exchange rate in the long run remain unchanged. Under the first assumption, exchange risk premia are unimportant, so that open interest parity holds:

$$(1)\quad s_t^e - s_t = \gamma(i_t^* - i_t)$$

where

s_t = log of the nominal spot exchange rate (foreign currency/home currency) in period t.

s_t^e = expected value of s γ years ahead

i_t = log of 1 plus the annual rate of interest on home-currency bonds with a term of γ years

"*" denotes foreign variable, "e" denotes expectations.

Under the second assumption, the expected value of the nominal spot exchange rate (s_t^e) in the long run (γ years ahead) is defined:

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14. The following discussion draws on Hooper and Mann (1989).

$$(2)\quad s_t^e = p_t^{*e} - p_t^e + q_t^e$$

where p_t^{*e} and p_t^e are log values of expectations in the current period about the levels of foreign prices and home prices, respectively, γ years ahead, and q_t^e is the constant expected long-run equilibrium value of the real exchange rate. Substituting current price levels and expected average annual rates of inflation (π) for expected future prices levels in (2), we have:

$$(3)\quad s_t^e = p_t^* + \gamma\pi_t^{*e} - (p_t + \gamma\,\pi_t^e) + q_t^e$$

Substituting the right hand side of (3) for s_t^e in (1), and rearranging yields:

$$(4)\quad s_t - p_t^* + p_t = q_t^e + \gamma(i_t - \pi_t^e - i_t^* + \pi_t^{*e}),$$

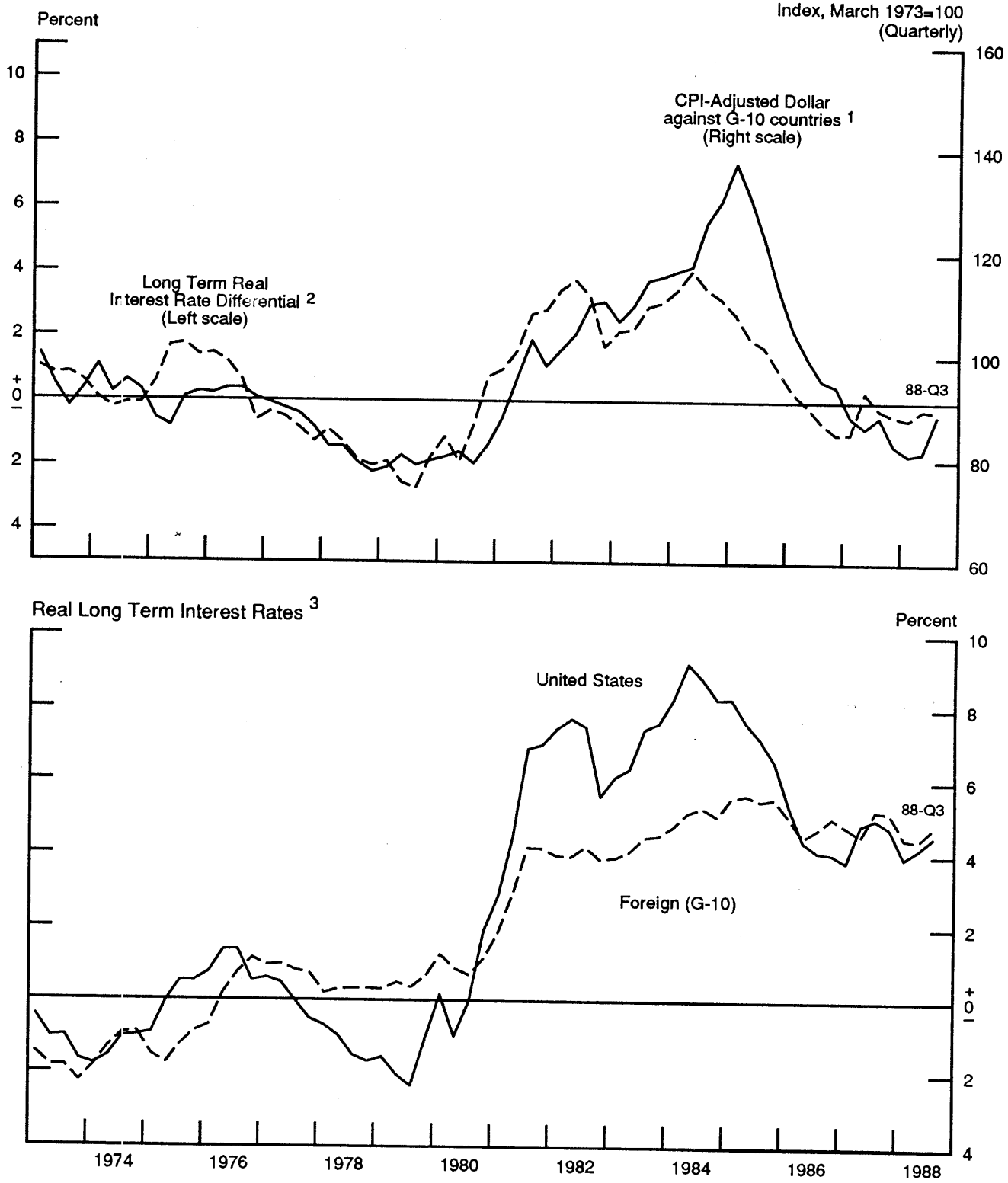
which expresses the log of the real exchange rate as a function of the expected real exchange rate in the long run and the real interest rate differential. The horizon γ is defined as being long enough for q_t^e to be considered constant.

An empirical representation of the relationship in equation (4) is given in Chart 4. The top panel of the chart shows the real dollar against G-10 currencies and a measure of the difference between U.S. and foreign (G-10) long-term real government bond yields. The bottom panel shows the U.S. and foreign components of the real interest differential. In calculating the real bond yields, a three-year centered moving average of CPI inflation rates (i.e., ranging from six quarters in the past to six quarters in the future) was used as a proxy for inflation expectations. (The countries and weights in the foreign interest rate index are the same as in the exchange rate index.)

Movements in the dollar's real exchange rate have been at least roughly correlated with the long-term real interest rate differential

Chart 4

The Dollar and Real Interest Rates
(Quarterly data)



Source : Federal Reserve Board macro data base.

1. The CPI adjusted dollar is a weighted average index of the exchange value of the dollar against the currencies of the foreign Group-of-Ten countries plus Switzerland, where nominal exchange rates are multiplied by relative levels of consumer price indexes. Weights are proportional to each foreign country's share in world exports plus imports during 1978-83.
2. Long-term real U.S. interest rate minus weighted average of long-term real foreign-country interest rates.
3. Long-term government or public authority bond rates adjusted for expected inflation estimated by a 36-month centered calculation of actual inflation. Foreign index uses the same trade weights as described in note 1.

over much of the floating-rate period.[15] The decline in the dollar during the 1970s followed a general downtrend in the interest differential. The rise in U.S. real interest rates in the early 1980s then accounted for much of the rise in the dollar, at least through early 1984. And, during 1985-86, the dollar fell as U.S. real interest rates declined.

During 1984, however, the dollar continued to rise after U.S. real interest rates had turned sharply downward relative to those abroad. While the relationship is far from perfect, movements in real interest rates nevertheless do appear to have been a major factor underlying longer-term swings in the dollar's real exchange rate over the floating rate period. Movements in the dollar's real exchange rate have also been a good indicator of movements in the nominal exchange rate, as changes in relative domestic consumer prices have been small in comparison.

B. Macroeconomic Policies.

The influence of macroeconomic policies on real interest rates and exchange rates has received considerable attention in the literature. The rise in U.S. real interest rates in the early 1980s has been attributed to a combination of monetary tightening beginning with the shift in the Federal Reserve's operating procedures in November 1979, and fiscal expansion following the passage of the federal tax cuts in 1981.[16]

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15. The simple correlation between the two series shown in the top panel of the chart is .85 for the period 1973-83, and .78 for the entire period shown.

16. See Blanchard and Summers (1984) for an analysis of factors underlying the rise in real interest rates in the early 1980s. Analyses by Branson (1988), Branson, Fraga and Johnson (1985), Feldstein (1986) and Hooper (1985) all link the rise in the dollar to the 1981 tax cut through its impact on real interest rates.

Similarly, the decline in U.S. real rates during 1984-86 has been linked to both the adoption of a more accommodative monetary policy stance by the Federal Reserve, and improved prospects for a significant reduction of the federal budget deficit following the passage of the Gramm-Rudman legislation in 1985.[17]

Quantitative estimates of the impacts of shifts in U.S. and foreign macroeconomic policies during the early 1980s (on real interest rates, the dollar, and the U.S. real external deficit) are provided by Hooper and Mann (1989). Their estimates are based on a combination of OECD and IMF estimates of shifts in structural budget deficits and the results of policy simulations reported by a group of 12 multicountry models in a March 1986 Brookings conference.[18] The models that took part in the Brookings exercise simulated the effects of sustained exogenous shifts in government spending in the United States and in other OECD countries, while holding the growth of monetary aggregates exogenous. They also simulated the effects of an exogenous change in the U.S. money stock. The theoretical structure that most of these models conform to is the "expectations-augmented" Mundell-Fleming model, as described, for example, by Frankel (1988).

The average model simulation results suggested that a U.S. fiscal expansion equivalent to 1 percent of GNP during the early 1980s would have raised U.S. GNP for several years, and eventually led to a 1/2 percentage point increase in U.S. long term real interest rates relative to foreign rates, a 2 to 2-1/2 percent appreciation of the dollar in real terms against OECD currencies on average, and a $15 - $20 billion decline

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17. See Johnson (1986).
18. The results of the conference are documented in Bryant, Henderson, and others (1988).

in the current account balance. A fiscal contraction abroad would also have induced an appreciation of the dollar and a decline in the U.S. current account balance, though by smaller amounts than a comparable U.S. fiscal shock. A U.S. monetary contraction would have raised the real interest rate differential and the dollar's exchange rate, but it also would have reduced U.S. real income. With the fall in income tending to reduce imports and the rise in the dollar working in the opposite direction to depress net exports, the U.S. monetary contraction by itself would have had a negligible impact on the current account balance.

Using these simulation results, H-M estimate that the combined effects of the U.S. fiscal expansion and the foreign fiscal contraction in the early 1980s accounted for only about one-third of the increase in the long-term real interest rate differential between late 1979 and early 1984, and about one-fifth of the rise in the dollar to its peak in early 1985. At the same time, the fiscal shifts accounted for between half and two-thirds two-thirds of the widening of the current account deficit. Much of this impact on the current account resulted from the strong effects that the shifts in fiscal policy are estimated to have had on relative GNP growth. (However, the actual level of U.S. GNP relative to foreign (OECD) GNP rose much less over the first half of the 1980s than the effects of the fiscal shifts alone would have suggested. This is because other factors tended to depress U.S. relative GNP growth, as discussed below.)

H-M also conclude that much of the remaining rise in the real interest differential (and hence the dollar) can be explained by a significant tightening of U.S. monetary policy relative to monetary policy abroad, beginning in late 1979. However, the U.S. monetary

tightening by itself does not explain any of the widening of the current account deficit. This is because the U.S. monetary tightening, in the face of double-digit inflation, significantly reduced U.S. real GNP growth. The positive current account effects of the reduced growth in output were large enough to offset the negative effects of the rise in the dollar caused by the same monetary tightening.

H-M's quantitative estimates suggest that, taken separately, neither the shift in monetary policy alone nor the shift in fiscal policies alone can adequately explain the changes in the U.S. external sector that took place during the first half of the 1980s. Taken <u>together</u>, however, the combined effects of these policy changes can explain something approaching two-thirds of the increases in both the dollar and the current account deficit. They suggest that explanations for the remaining rise in the dollar and the widening of the current account deficit may be found in exchange market bubbles and the international debt crisis, among other factors.

This analysis implies that in the period ahead, a significant reduction of the U.S. external deficit could be achieved through some combination of U.S. fiscal contraction and foreign fiscal expansion. In the absence of further fiscal expansion abroad, achieving the adjustment without a substantial reduction in U.S. growth would require some monetary easing. In this case more of the adjustment would depend on the expenditure-switching effects of a decline in the dollar induced by lower U.S. interest rates. Some observers have suggested that the announcement of a credible and substantial planned reduction in the budget deficit would cause the dollar to appreciate, because of the favorable implications of that announcement for the external deficit. (In terms of

the exchange rate model described above, expectations about the long-run equilibrium real exchange rate would be revised up.) In this case, however, significant external adjustment would have to depend on a substantial reduction in domestic expenditures. Such a reduction in expenditures would result in significantly lower interest rates, which, in turn, would tend to weaken the dollar.

At the same time, the effectiveness of dollar depreciation by itself, as a means of reducing the deficit, is diminished by the current high level of resource utilization in the U.S. economy. Some slowing of growth in U.S. domestic expenditures, ideally through either a fiscal contraction or an increase in private savings (or, less ideally, through a reduction in domestic investment) would be needed to accommodate a significant further expansion of U.S. net exports. If such accommodation were not forthcoming, the increase in aggregate demand and resulting upward pressure on domestic prices and interest rates, would tend to reverse both the decline in the dollar in real terms and the improvement in the external balance.[19]

V. Exchange Rates and Productivity in the Longer Run

To this point the analysis has considered primarily the shorter-run effects of macroeconomic policies on external adjustment through their impacts on real interest rates, competitiveness and relative domestic demand. This section addresses the possible effects of large

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19. In addition to the negative effect of a higher real dollar exchange rate on net exports, the increase in aggregate demand would raise demand for imports, and the increase in U.S. interest rates would depress net exports through its impact on net investment income payments to foreigners (given the large and growing U.S. net international debt position).

(and sustained) shifts in exchange rates on relative productivity and external adjustment in the longer run.

Exchange rates are related causally to relative (U.S./foreign) labor productivity, through their impact on relative capital formation. Relative capital formation, in turn, is influenced by exchange rates through their impacts on relative labor costs. Fixed investment decisions are based on a number of factors that influence and expected return on the investment. One important factor is the cost of variable inputs, of which labor is a major component. Chart 5 illustrates the relationship between movements in the ratio of foreign to U.S. manufacturing capital stocks (bottom panel) and relative levels of unit labor costs in manufacturing (top panel) over the past three decades.[20] (The capital stock ratio shown here was constructed from OECD data, as described by Hooper (1988); the unit labor costs shown are the same data that were discussed in Section III, but limited to the five foreign countries -- Japan, Germany, France, the United Kingdom and Canada -- for which capital stock data are available.)

The chart indicates that the ratio of U.S. to foreign capital fell sharply during the 1960s and early 1970s when U.S. labor costs were well above those abroad, on average. The downtrend in the capital stock ratio was then reversed in the latter 1970s when foreign labor costs rose above the U.S. level as a result of the decline in the dollar during that period. The capital stock ratio turned down again in the early 1980s

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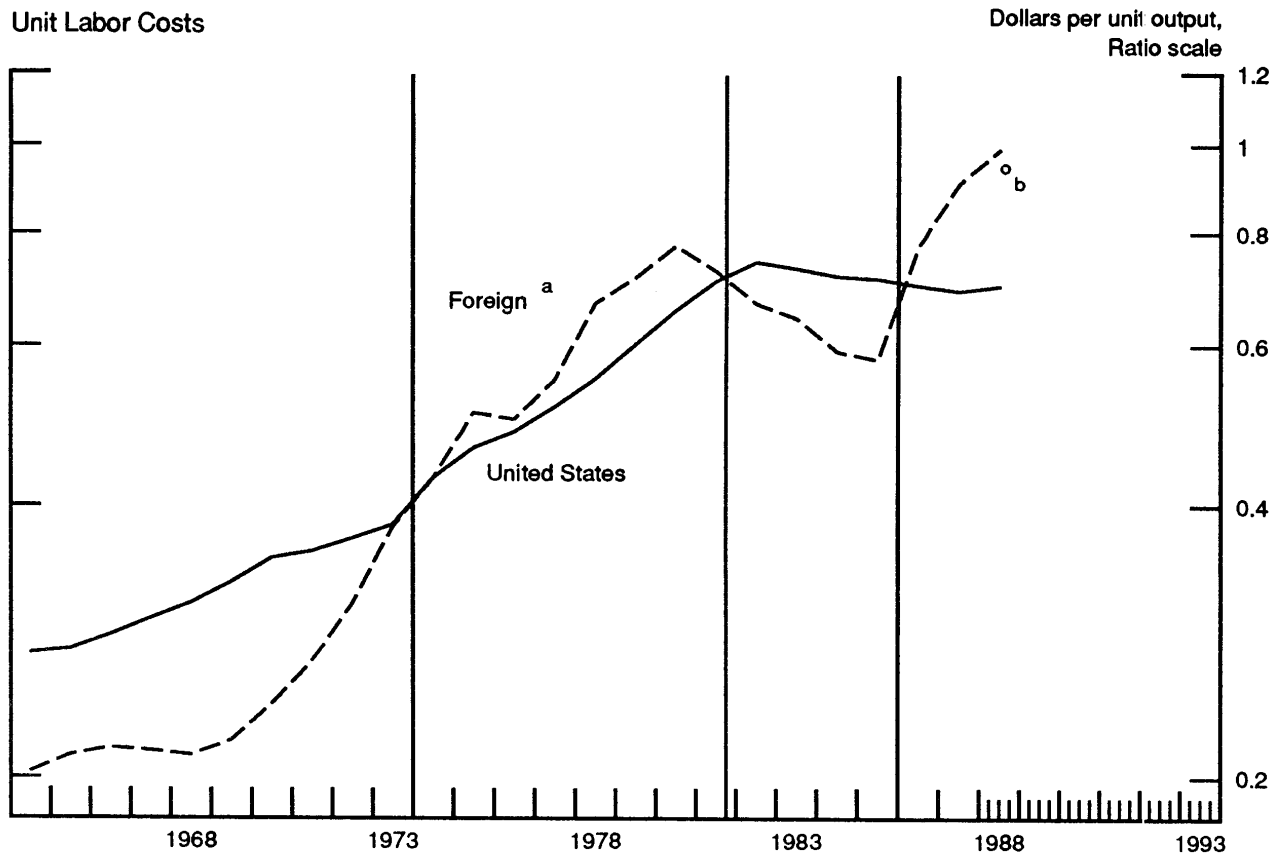
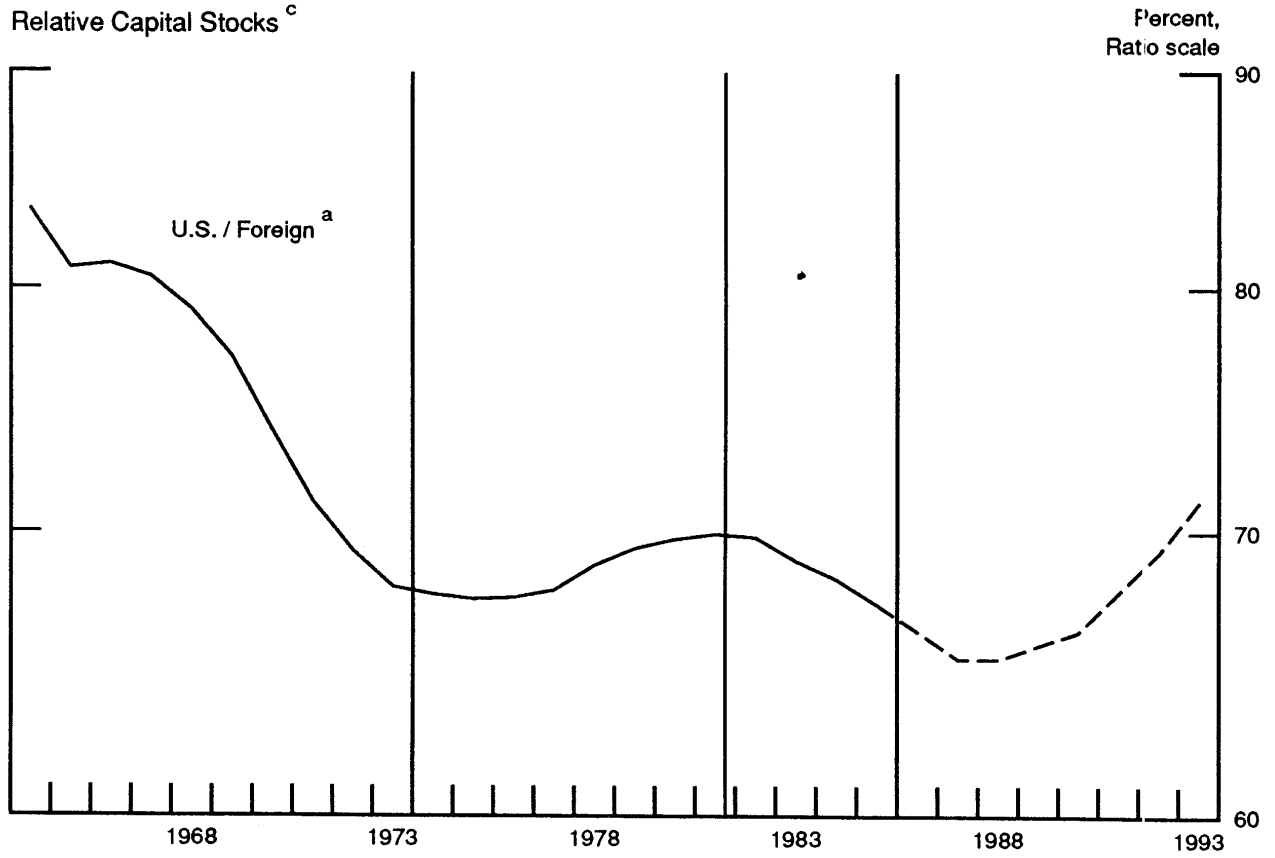
20. The capital stock ratio shown here was constructed from OECD data, as described by Hooper (1988); the unit labor cost shown are the same data that were discussed in Section III, but limited to the five foreign countries -- Japan, Germany, France, the United Kingdom and Canada -- for which capital stock data are available.

Unit Labor Costs and Relative Capital Stocks in Manufacturing





a. Foreign includes average of Japan, Germany, France, Canada, and the United Kingdom, in dollars, weighted by manufacturing output.

b. Estimate based on levels of nominal exchange rates in 1988 Q3. Chart is plotted using averge exchange rate for 1988 Q1-Q3.

c. Calculated from OECD estimates of U.S. and foreign real capital stocks in manufacturing, measured in 1980 dollars.

when the rise in the dollar pushed U.S. labor costs back above the foreign level.

Causation runs in both directions between the top and bottom panels of the chart. During the 1960s, the direction of causation probably ran chiefly from relative capital stocks to relative unit labor costs. Unit labor costs abroad were held down by rapid increases in productivity that resulted in part from the rapid rate of capital formation abroad during that period. During the 1970s and 1980s, causation probably ran the other direction, since most of the variation in relative unit labor costs was due to swings in nominal exchange rates rather than movements in relative productivity (as we saw in Section III). The correlation between movements in the capital stock ratio and movements in the ratio of foreign to U.S. unit labor costs over the floating rate period (1973-85) is .45. Movements in the ratio of U.S. to foreign capital stocks in manufacturing evidently were significantly influenced by factors other than relative unit labor costs. Nevertheless, relative labor costs appear to have had at least some impact on relative rates of capital formation over the floating rate period.

Should the recent differential between U.S. and foreign unit labor costs persist, it could help to induce another upturn in the capital stock ratio. For illustrative purposes, the path of the capital stock ratio has been extended through 1993 in Chart 5 under the optimistic assumptions that: (1) the growth of foreign real gross investment in manufacturing slows to about 3 percent per year, (2) U.S. real gross manufacturing investment continues to grow at the rapid pace (nearly 11 percent) recorded in 1988, and (3) both U.S. and foreign

replacement investment continues to grow at 5 percent per year.[21] Of course, the realization of such a shift in capital stocks would depend heavily on whether U.S. macroeconomic policies were conducive to a significant expansion of U.S. capital formation in manufacturing.[22]

The data in Chart 5 suggest the distinct possibility of a causal link from exchange rates to relative capital stocks. To complete the connection between exchange rates and relative productivity, a link between relative capital stocks and relative productivity must also be established. In a production function or growth accounting framework, labor productivity depends on the ratio of capital to labor, as well as on total factor productivity, or Hicks-neutral technical progress. Relative (U.S./foreign) capital-labor ratios can be constructed using available BLS data on hours worked in manufacturing in the United States and major foreign industrial countries. These data are shown in Chart 6, the dashed lines are actual hours, and the solid lines are the underlying trends (which were obtained in regressions of actual hours against a constant and time over the historical period shown). The actual hours series show significant cyclical fluctuations -- witness the large drop in U.S. hours worked during both the 1975 and 1982 recessions. The underlying trend in the U.S. case has been flat over the past two decades, and that in other major countries, on average, has been distinctly negative.

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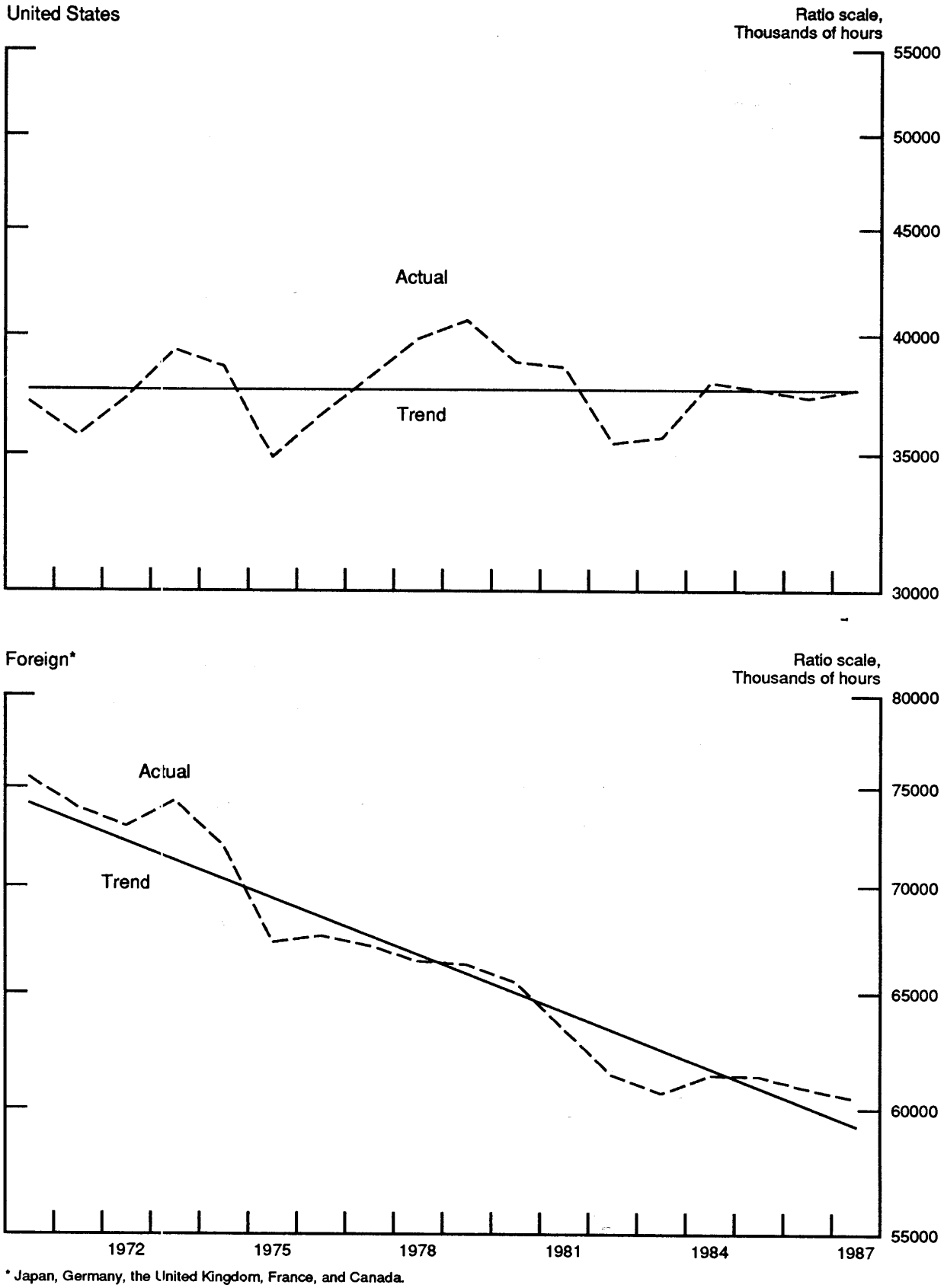
21. See Hooper (1988).
22. Maintaining a rapid rate of growth of manufacturing investment would not require substantial cutbacks in other expenditure categories, however. In recent years, investment in manufacturing has accounted for only about 13 percent of total private fixed investment and 2-1/2 percent of real GNP.

Chart 6

Hours Worked in Manufacturing



* Japan, Germany, the United Kingdom, France, and Canada.

The top panel of Chart 7 shows the ratios of U.S. to foreign hours worked in manufacturing, using both actual data and underlying trends. The trend ratio has been extrapolated through 1993 at its historical growth rate. The bottom panel compares movements in U.S. relative to foreign productivity in manufacturing with those in (1) relative (U.S./foreign) capital stocks, (2) relative capital-labor ratios based on actual hours worked, and (3) relative capital-labor ratios based on the trends in hours worked. The relative productivity series is the same as that shown in the top panel of Chart 3. The relative capital-labor ratios were computed by dividing the U.S./foreign capital stock ratio by the U.S./foreign hours ratios shown in the top panel of Chart 7. As might be expected, the correlation between relative productivity and either of the relative capital/labor ratios, is quite high (.90 in the case of actual hours, and .92 in the case of trend hours).

These data and extrapolations suggest that if labor inputs and technical progress at home and abroad continue to grow at their recent historical trend rates, and if relative capital stocks turn around as strongly as shown in this illustration, the improving performance of U.S. relative labor productivity in recent years would continue, and could even strengthen further. This improvement would lessen the need for significant further depreciation of the dollar in order to achieve external balance in the longer run.[23]

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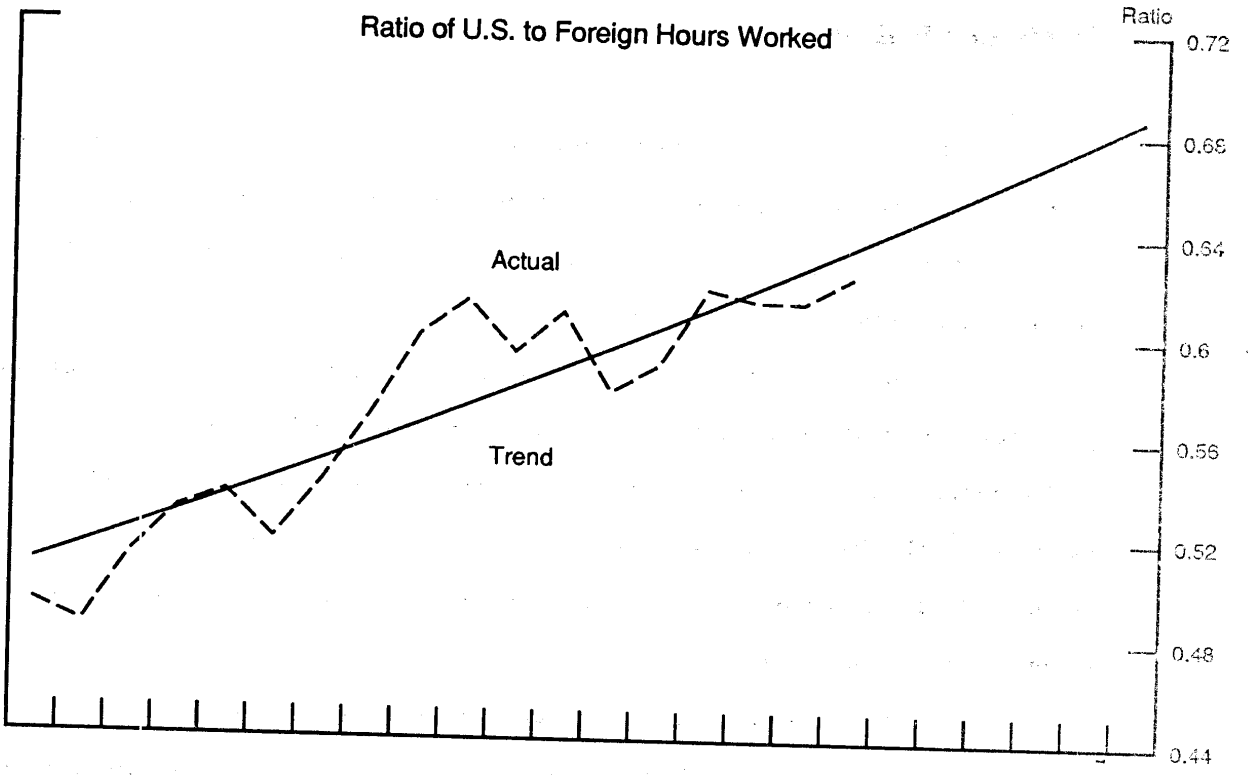
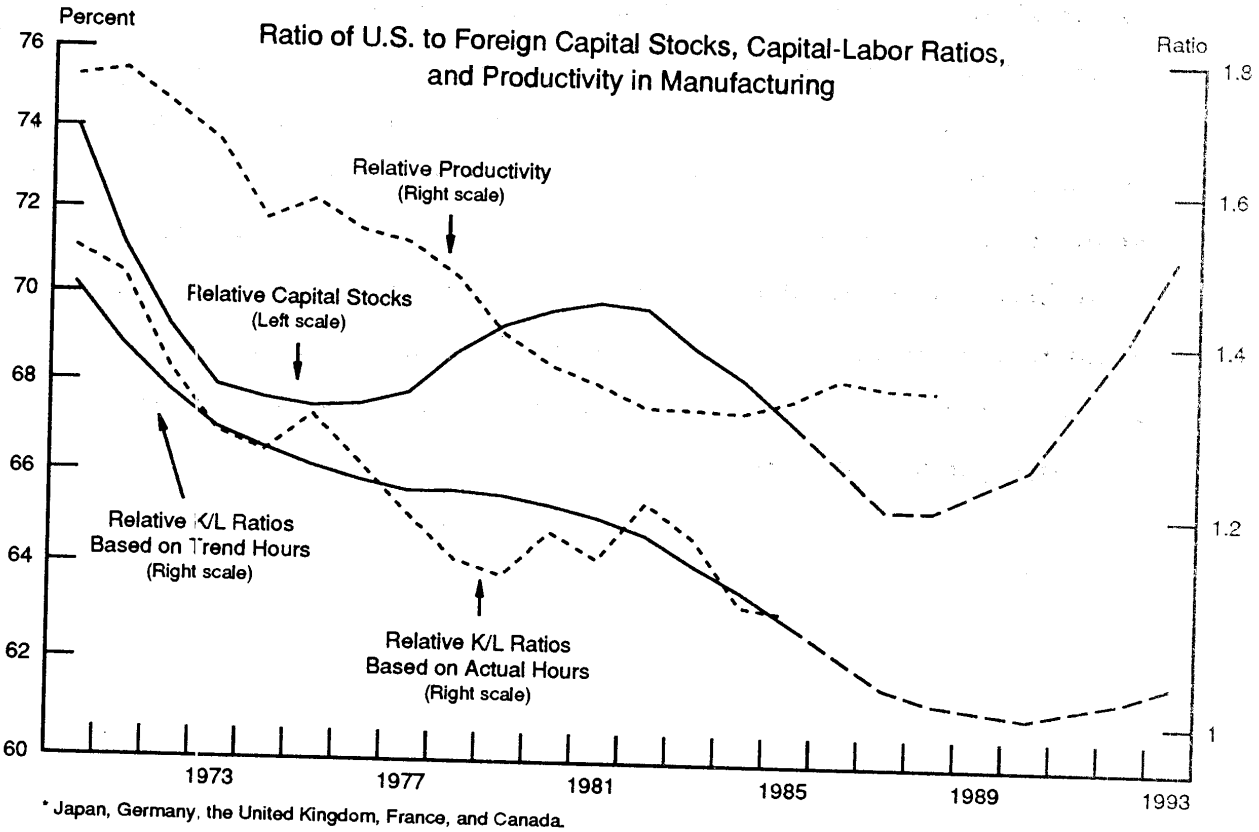
23. Hooper (1988) analyzes the implications for the current account of the shift in capital stocks considered here, based on simulations with conventional models of the U.S. current account.

Chart 7

U.S. and Foreign* Relative Hours and Relative Capital-Labor Ratios in Manufacturing





* Japan, Germany, the United Kingdom, France, and Canada.

VI. Conclusions

This paper makes essentially four points. First, movements in U.S. international price and cost competitiveness have been major factors underlying swings in the U.S. external balance, particularly those in real net exports, over the past two decades.

Second, since the early 1970s, movements in U.S. international price and cost competitiveness have been dominated by swings in nominal exchange rates. In the aggregate, movements in relative productivity between the United States and other countries have had only minor impacts on U.S. international competitiveness in comparison to the influence of changes in exchange rates.

Third, movements in exchange rates, and therefore in price and cost competitiveness and the external balance, have been determined to a large extent by shifts in U.S. and foreign macroeconomic policies, through their impacts on relative real rates of return on assets.

Fourth, the recent labor cost differential in favor of the United States, if sustained, could induce a shift in relative capital stocks in manufacturing that would result in significant gains in U.S. relative to foreign labor productivity in manufacturing. Such gains could reverse the long-standing downward trend in U.S. relative productivity, and would lessen any further depreciation of the dollar that might be needed to achieve U.S. external balance.

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