International Finance Discussion Papers

Number 316

November 1987

THE U.S. EXTERNAL DEFICIT: ITS CAUSES AND PERSISTENCE

by

Peter Hooper and Catherine L. Mann

ABSTRACT

This paper presents an empirical analysis of the macroeconomic and microeconomic factors underlying the causes and persistence of the U.S. external deficit in the 1980s. The paper begins with a review of the extensive literature on this subject, and then outlines an analytical framework that synthesizes several different approaches taken in previous studies. The proximate causes of the deficit are assessed using a partial-equilibrium model of the U.S. current account. We find that the decline in U.S. price competitiveness associated with the appreciation of the dollar over the first half of the decade was the dominant factor, while the excess of U.S. growth over growth abroad also contributed significantly. At a more fundamental level, drawing on average policy multipliers from a group of international macro models, the rise in the dollar and the growth gap that led to the deficit can be explained by the combination of a relatively restrictive U.S. monetary policy and expansive U.S. fiscal policy, along with fiscal contraction abroad. While the initial widening of the deficit can be adequately explained by macroeconomic factors, the deficit has adjusted substantially more slowly (particularly in real terms) to the fall in the dollar since early 1985 than conventional macro trade equations would predict. Analysis of the pricing behavior of foreign exporters, both in the aggregate and for a number of narrowly defined commodities, suggests that foreign profit margins have been squeezed more in response to the fall in the dollar than previously. Moreover, some foreign producers have benefited from significant reductions in production costs. Finally, quantitative restraints on U.S. trade appear to have slowed the adjustment of the trade balance to the decline in the dollar.

TABLE OF CONTENTS

The U.S. External Deficit: Its Causes and Persistence

by

Peter Hooper and Catherine L. Mann[1]

I. Introduction and Summary

The emergence and persistence of an unprecedented U.S. trade deficit during the 1980s has become a matter of central concern to economic policymakers. With each month's announcement of another record imbalance, pressure to "do something" about the deficit mounts. Policy solutions range from fiscal and monetary reform to trade policy reform, both at home and abroad. This paper analyzes the U.S. external deficit with the view that any policy action that is taken, if it is to be effective and appropriate, should be based on a clear understanding of the causes of the deficit and its persistence.

Much has been written on the causes of the deficit, considerably less on the reasons for its persistence. We begin with a review of the literature in Section II. We see several distinct perspectives on the causes and persistence that are, in fact, complementary; to a certain extent these perceptions reflect different levels of analysis from within an internally consistent model. (We say more about this model in Section III.)

---

1. The authors are members of the staff of the Division of International Finance, Board of Governors of the Federal Reserve System. The views expressed in the paper are our own and do not necessarily reflect the views of the Board of Governors or other members of its staff. Catherine L. Mann worked on this project while on leave at the National Bureau of Economic Research and thanks the Ford Foundation for financial support. We have benefited from comments and suggestions by William L. Helkie, David H. Howard, Ellen Meade, Jaime R. Marquez, Kathryn A. Morisse, and Lois Stekler. We also thank Virginia Carper, Lucia Foster, and Kathryn A. Larin for their excellent research assistance. This paper was originally prepared for a conference on "The U.S. Trade Deficit Causes, Consequences and Cures", at the Federal Reserve Bank of St. Louis, October 23-24, 1987.

At one level, a number of studies have attributed the deficit to the decline in U.S. price competitiveness (associated with the appreciation of the dollar during the early 1980s), the relative strength of domestic growth in the United States, and the international debt situation. The relative importance of these factors in explaining the origin of the deficit varies across the studies, as do the roles these factors may play in resolving the deficit.

At a more fundamental level, the origin of the deficit has been attributed to shifts in monetary and fiscal policies that reduced the national savings rate in the United States as compared to that in other countries, while raising U.S. real interest rates, domestic growth, and the dollar relative to their foreign counterparts. Several studies stress the importance of the U.S. fiscal expansion as the major causal factor; some even claim that the external deficit will persist until the federal budget deficit is reduced. Others stress the importance of the U.S. monetary contraction in the early 1980s, and exogenous shifts in international preferences for dollar assets.

While the literature focuses predominantly on macroeconomic causes, bilateral deficits with certain countries (Japan in particular) have been examined from the microeconomic standpoint as well. These studies find microeconomic distortions, such as financial deregulation, agricultural policy, export controls, and foreign trade barriers, to be of secondary importance as causes of the deficit. However, the role of trade barriers in the persistence of the deficit may be more important. In view of the attention being given to microeconomic -- particularly protectionist -- solutions to the deficit, microeconomic reasons for the

deficit and its persistence are given considerable attention in this paper.

Section III presents our own framework for macroeconomic and microeconomic analysis which is general enough to encompass the various perspectives outlined in the literature review. The basic macroeconomic framework is drawn from an expectations-augmented Mundell-Flemming model. We outline the partial-equilibrium net export sector, as well as various accounting identities related to the external balance, that can be extracted from the underlying macroeconomic model. We also describe the model of exchange rate determination that is used in our empirical analysis.

In Section IV, we briefly review data on the widening and persistence of the external deficit in both real terms and nominal terms. This review covers trends in the overall deficit and its major trade and service account components since 1980, as well as some details on key developments in the trade account by commodity and region, and by quantity and price.

Our empirical analysis of the partial-equilibrium "causes" of the deficit -- that is, the roles of relative economic growth and changes in relative prices -- is presented in Section V. We find, based on an analysis of conventional trade equations, that the change in relative prices associated with the rise in the dollar between 1980 and early 1985 was the most important partial-equilibrium factor. The relatively rapid growth through 1986 of GNP and especially domestic expenditures (C+I+G) in the United States, as compared to the rest of the world, also contributed significantly to the deficit. In empirical tests we find little basis for choosing between GNP and domestic expenditures as the

determinant of trade volumes, and we conclude, largely on a priori grounds, that a combination of the two is appropriate. Using either measure of growth, the widening of the deficit between 1980 and 1986 can be more than accounted for by changes in relative prices and relative growth in the United States and the rest of the world.

However, we also find that a conventional macro trade model that reflects the experience of the past two decades cannot fully explain the persistence of the real trade deficit to mid-1987. While the real trade deficit was substantially smaller in mid-1987 than it would have been if the dollar had not declined from its peak (ceteris paribus), that deficit was adjusting more slowly to the fall in the dollar than the model predicted it would. The model's prediction error reflected in part overprediction of aggregate import prices, which were rising substantially less rapidly than past experience would have suggested. Import prices were slow to adjust partly because of a squeezing of foreign profit margins, and partly because of a reduction in foreign production costs that is not adequately picked up in movements in aggregate foreign prices.

We analyze the causes of the deficit at the more fundamental level of the domestic and foreign policy mix, in Section VI. This section begins with an analysis of the contribution of changes in long-term real interest rates to movements in the dollar in real terms (based on an open interest parity model). We find that this primary channel through which macroeconomic policies influence real exchange rates can explain much, but not all, of the longer-term movements in the dollar in real terms. We then draw on the results of simulations with a wide range of macroeconometric models in an effort to quantify the effects of shifts in

policies. The simulation results suggest that the fiscal expansion in the United States and fiscal contraction in other industrial countries during the first half of the 1980s can explain about two-thirds of the U.S. external deficit, but that they explain a much smaller portion of the rise in the interest differential and the dollar. According to the models, the shift in relative fiscal policies alone (holding money growth at home and abroad unchanged) would have widened the current account deficit primarily through a substantial increase in U.S. GNP growth relative to growth abroad. However, when the shifts in fiscal policies are combined with the relative tightening of U.S. monetary policy that took place in the early 1980s, we can explain roughly two-thirds of both the rise in the dollar and the widening of the external deficit. The remainder of the deficit we attribute to debt problems in developing countries, agricultural policies, and to a significant appreciation of the dollar during 1984 that was not related to economic fundamentals (and which some studies have suggested reflected speculative behavior in foreign exchange markets).

In Section VII, we turn to an analysis of microeconomic factors that may have contributed to the deficit and its persistence. In particular, we examine the pricing behavior of U.S. and foreign exporters, and possible structural changes in the pass-through relationship that may help to explain the persistence of the deficit. We also investigate the contribution to the external deficit of protectionist policies and other barriers to trade at home and abroad.

We find evidence of a shift in the pricing of U.S. imports and exports that has tended to dampen the effects of the dollar's decline and prolong the deficit. We also find that barriers to trade, both at home

and abroad, probably contributed only marginally to the initial widening of the deficit. However, protection abroad, along with quantitative restraints on U.S. imports and restrictions at home on U.S. exports, may have become a more significant factor underlying the recent persistence of the deficit in the face of the dollar's sharp decline.

Our conclusions, including the implications we draw from this study of the past and present for possible courses of action in the future, are given in Section VIII.

II. Literature Review

The magnitude of the U.S. current account deficit is nearly matched by the volume of material that has been produced to explain its existence. But, just as the current account has yet to improve, so too has the literature lagged somewhat in its efforts to explain the persistence of the deficit. Our objective in this section is not so much an exhaustive review of the literature, as it is an attempt to generalize the literature and place it within a common framework that is further developed in the next section. From this common framework, we can then focus on how the similarities and differences of emphasis and results from these analyses can yield quite different views on appropriate and effective policy for reducing the deficit.

There are three relatively distinct, but nevertheless related, approaches to analyzing the causes of the deficit; two are macroeconomic in focus, and the third is microeconomic. These approaches are distinct in that they can lead to different policy prescriptions, but they are

related in that they all are more or less derived from the basic open-economy IS-LM model. The features that distinguish the approaches are essentially the degree to which they (1) focus on the partial-equilibrium current account per se, (2) explain the movements in the variables that are taken as exogenous in the partial-equilibrium approach by analyzing the deficit within a full general-equilibrium model, (3) focus on accounting identities that are derived from a general-equilibrium model, or (4) factor microeconomic incentives into the analysis.

The partial-equilibrium "elasticities" approach usually ascribes the widening of the deficit to the appreciation of the dollar and the differences in growth rates of economic activity between the United States and the other industrial countries. The debt crisis is often given a separate role. This is partial analysis in that the movements in the dollar, the differences in economic activity, and the debt crisis are taken as given. The theoretical foundations for this approach are outlined in, for example, Laursen-Metzler (1950), which examines the conditions for a successful devaluation, and Dornbusch (1980).

The representatives within this strand of the literature do not necessarily agree on the allocation of the deficit to the two major factors of dollar and growth, and they therefore may not agree on policy prescriptions. For example, even though Bryant and Holtham (1987), Bergstrand (1987), Helkie and Hooper (1987), Krugman and Baldwin (1987), Marquez (1987), Marris (1985), and Reinhart (1986) all agree that the rise in the dollar accounts for the majority of the deterioration of the current account, they interpret this result with different policy perspectives.

The specification for the volume equations varies between Helkie-Hooper (HH), Krugman-Baldwin (KB), Marquez, and Marris, who provide perhaps the most comprehensive sets of estimates. HH use GNPs as activity variables and include a proxy for secular shifts in relative supplies in a model of the U.S. current account, whereas KB use domestic expenditures and do not include proxies for supply-shifts in a model of the partial trade balance. The result is that HH attribute substantially less of the deficit to the income growth differentials (since the GNP growth differentials were much less than the growth differentials of domestic expenditure and since the inclusion of supply proxies tends to reduce the income elasticity of imports). Nevertheless, KB, even with their specification, suggest that even if the growth gap were closed, we would still be left with a sizeable deficit. Marquez uses GNP with no supply proxies in a global bilateral model of merchandise trade and attributes about two-thirds of the U.S. deficit to appreciation of the dollar and one-third to relative GNP growth. In an model of the U.S. current account (with imposed coefficients, and in which aggregate trade volume equations are a function of GNPs and relative prices), Marris concludes that the growth gap accounts for about one-fourth of the $103 billion widening of the current account deficit between 1980 and 1984, while the strong dollar accounts for about two-thirds. The debt crisis and the decline in net investment income accounts for the rest.

Bergstrand and Reinhart both estimate bilateral trade equations. Bergstrand covers bilateral trade between the United States and the United Kingdom, France, Germany, Japan, and Canada; Reinhart covers just U.S.-Japan trade. Bergstrand's results corroborate the results of HH and KB's work. Reinhart attributes a significantly larger amount of

the bilateral U.S.-Japan trade deficit to the slow growth of income in Japan relative to the United States, suggesting a greater role for jawboning the Japanese into expanding their economies.

Bryant-Holtham (BH) reflect on the results of a January 1987 Brookings workshop on the U.S. current account in which a number of partial-equilibrium models of the U.S. current account (including the HH model) reported on comparative simulations involving changes in exchange rates and in U.S. and foreign growth. One implication they draw from the results is that only coordinated macroeconomic policy -- expansion overseas and contraction in the United States -- along with a moderate further decline in the dollar, will significantly reduce the deficit. Excessive dependence on the dollar for adjustment is likely to result in too much inflation in the United States and deflation abroad. Failure of the foreign economies to expand in conjunction with a fiscal contraction in the United States is a recipe for world recession.

A somewhat different tack is taken by representatives of the accounting approach to the balance of payments. Total domestic savings minus investment equals the current account deficit. Proximate causes of the deficit therefore are either booming investment in the United States relative to overseas, as suggested by Darby (1987), or a U.S. savings rate that is too low relative to foreign savings rates, especially that in Japan (a view exposed by many, including Bergsten and Cline (1985)). Mundell (1987) and McKinnon and Ohno (1986) both outline a savings-investment link to the current account which suggests the irrelevance of the exchange rate to current account equilibrium. As KB point out, however, this result apparently rests on the strong assumption that changes in nominal exchange rates do not have a lasting influence on

relative prices. Persson and Svensson (1985) also examine these linkages in a theoretical framework that focuses on how the current account evolves when shocks to the terms of trade and real interest rates are transmitted through savings and investment. They reach very different conclusions about the efficacy of using exchange rate changes to achieve current account equilibrium.

Of course, most of these authors recognize that the exchange rate, income, savings, and investment are all endogenous, and many of them either appeal to or have themselves authored articles that link the partial-equilibrium elasticities explanation for the deficit with the general-equilibrium policy-fundamentals approach. This linking tends to focus on one or another of the proximate causes -- what moves the dollar, causes the growth gap, or affects savings and investment rates -- and then proceeds to explain that variable using the policy fundamentals -- fiscal policy, monetary policy, or the policy mix in the United States by itself or in concert with (or in contradiction to) the other major industrial countries. Within this literature, there are widely varying views about the fundamental causes of the deficit.

Those who lean more or less towards "budget deficit" or fiscal policy explanations include Branson, Fraga, and Johnson (1985), BH, Feldstein (1986a), HH, Hooper (1985), Hutchinson-Piggot (1984), Laney (1984), and Marris. The general idea is that the U.S. fiscal expansion (in many cases in conjunction with fiscal contraction abroad), led to an increase in U.S. relative growth, an increase in the long-term real interest rate differential and an appreciation of the dollar, all of which caused the current account to deteriorate. A good survey of the theoretical underpinnings of these and counter arguments (which

essentially asks under what conditions Ricardian Equivalence holds) is in Leiderman and Blejer (1987).

Darby (1987) points to tight money in the United States as the fundamental cause of the deficit. Basically, this argument suggests that there has been little empirical evidence supporting the notion that budget deficits and real interest rates are linked, whereas money growth and interest rates are clearly linked. Thus, it was the tightening by the Fed that led to increases in real interest rates, which along with tax-cut-induced declines in the cost of capital, made investment in the United States more attractive, caused the dollar to appreciate, and the current account to plunge.

Some studies have stressed the role of "micro-incentives" to save, invest, or diversify their investment portfolios. Darby, et al (1987) view the cut in U.S. tax rates as contributing to the attractive investment opportunities in the United States. Hayes, Hutchison, and Mikesell (1986a) (HHM) and others look to the structure of Japanese society for an explanation of high Japanese savings rates. Friedman and Sinai (1987), Bergsten and Cline, Saxonhouse (1983), and HHM suggest that changes in financial regulation affected the demand for U.S. and dollar assets, contributing to the appreciation of the dollar and deterioration of the trade balance.

A relatively small set of authors cannot find one villain, but instead assert that it was the "policy mix" -- fiscal expansion and monetary contraction in the United States, in combination with the opposite mix overseas -- that led to the speed and degree of deterioration of the deficit. Authors taking this line include, Sachs (1985), Obstfeld (1985), HHM (1986b), and Feldstein (1986b).

To complete the macroeconomic viewpoints, there are the full-scale general-equilibrium models that are specified in terms of the policy fundamentals and structural attributes of the economies. One theoretical foundation for this school is in Dornbusch and Fischer (1980). Authors that use quantitative macroeconomic models to analyze the causes of the deficit include Sachs and Roubini (1987) (using the McKibben-Sachs Global Model, MSG2), Masson and Blundell-Wignall (1985) (using the OECD's MINILINK model), and HH (using the Fed's Multi-Country Model as well as the results of simulations by a group of models that participated in a March 1986 Brookings conference reported in Bryant et al (1988)). These models often differ in their policy conclusions in large part because of different treatment of expectations and intertemporal constraints. In part also, these authors have tended to focus on the policy experiment that they believe is most relevant to explain the existence of the deficit (for backward looking analysis) or is the most likely policy to be followed (for forward looking analysis). Sachs and Roubini focus relatively more on fiscal experiments (as do Masson and Blundell-Wignall), as their model shows the U.S. external balance to be relatively more sensitive to shifts in fiscal policy than do other models. The work of HH and Hooper, who average the results of a diverse set of models, is reviewed and extended in Section VI below.

While most of the literature on the deficit has a macroeconomic focus, a growing portion addresses microeconomic factors underlying the deficit. To a certain extent, this literature reflects, more broadly, the growing interest in productivity and competitiveness. On the whole, however, most studies in this area suggest that microeconomic factors contributed only marginally to the widening of the deficit.

One notable exception to that general finding is in agriculture. Thompson (1987) and Tucker (1987) both argue that the halving of agricultural exports between 1981 and 1984 (which nevertheless accounts for only about $10 billion of the $160 billion deficit) was overwhelmingly due to the price supports written into the 1981 Farm Bill. The support prices were set well above world price levels for much of the first half of the decade. This choice of domestic policy instrument, along with the international debt crisis, the appreciation of the dollar, and the "success" of the Common Agricultural Policy, apparently doomed U.S. agricultural exports.

Trend movements in productivity and technological competitiveness are the focus of Marston (1986), KB, and Krugman-Hatsopoulos (1987). These authors argue that the severity of the deterioration of the deficit was the result of macroeconomic factors in combination with an underlying decline in the technological leadership of the United States and a slowdown in U.S. productivity growth relative to that in other major industrial countries, especially Japan and Germany. In part, these factors are to be expected as the U.S. economy matures. (Japan itself may well be slowing down relative to Korea.) But, these authors argue that the general trend in productivity growth masks a significant deterioration in relative productivity in the United States in key traded goods, particularly capital goods. Since capital goods represent more than one-third of U.S. trade, any significant change in the competitiveness of these products will have a substantial effect on overall trade volumes, and therefore the deficit. These analyses suggest that the dollar must fall substantially further than is suggested by Purchasing Power Parity calculations that use overall wholesale price

indexes (such as in McKinnon and Ohno (1987)) before the current account will improve.

A related topic is whether the appreciation of the dollar led to a structural loss in the competitiveness of U.S. manufactured exports that can only be regained at a much lower level of the dollar. This argument, and some empirical investigation, is in Baldwin and Krugman (1986), KB, Krugman (1986 and 1987), and Baldwin (1987). U.S. exporters may have retreated from international markets because of the strong dollar. Because the costs of entering a market are quite high, the dollar will have to fall much lower before it is worthwhile for U.S. exporters to reenter the foreign markets. A similar calculation faces foreign suppliers of imports to the U.S. market.

A number of authors have investigated the role of trade barriers; U.S.-Japan bilateral trade flows are a frequent focus. As a rule, these analyses (BC, HHM (1986a), Christelow (1986), Bergstrand (1986), Saxonhouse (1983 and 1986), HHM (1986b), and Bergsten and Williamson (1983)) find only a small role for trade barriers. For example, a figure of about $10 billion is frequently mentioned as the maximum improvement in the deficit if all Japanese trade barriers were removed. Moreover, many of these authors point out that relaxing U.S. export controls, especially on certain agricultural products and crude oil, would lead to an improvement in the deficit of about the same magnitude. Another set of authors, Darby and Kaempfer and Willet (1984), argue that macroeconomic forces determine the magnitude of the deficit, and microeconomic elements determine the composition of trade.

Some authors have looked to the theoretical literature on industry structure to see how external shocks might be transmitted

through the economy to contribute to the deficit. Once again, these authors (Woo (1984), Berner (1987), Mann (1986), and Baldwin (1987)) find only a small role for microeconomic structure in causing the deficit. Pricing strategies associated with an imperfectly competitive industry structure (which may be a consequence of product type, production technology, or trade barriers -- see Dornbusch (1987)) lead to foreign firms absorbing exchange rate movements into profit margins, thus offsetting to some degree the relative price signals that change trade volumes. While these changes were probably overshadowed by macroeconomic factors causing the deficit to widen, imperfect competition and trade barriers might play a significant role in the persistence of the deficit.

That persistence (in the face of a sharp fall in the dollar) is a more recent issue, and until quite recently has received less direct attention in the literature than the initial causes of the deficit. HH and KB both address the persistence of the deficit and conclude that it reflects for the most part normal lags in the adjustment to a depreciation of the dollar that followed a long period of appreciation. These studies also note that the deficit, while persistent, was considerably smaller in real terms by late 1986 than it would have been in the absence of the depreciation of the dollar, ceteris paribus. Berner (1987) and others have argued that the dollar really hasn't fallen as much in real terms as some aggregate exchange rate indexes would suggest, particularly against the currencies of key developing countries. Berner also cites reductions in foreign profit margins and various structural factors (such as off-shore migration of U.S. firms and rapid growth of industrial capacity in certain developing countries) as reasons for the persistence of the deficit. Loopesko and Johnson (1987) analyse

the persistence of Japan's trade surplus, and note that the surplus has been much slower to respond to the rise in the yen than past experience would predict (based on a model of the Japanese trade balance). They also find that Japanese export prices (and by implication profit margins) have declined substantially more in response to the rise in the yen than they did under similar circumstances in the past.

We turn now to a description of our own framework for analyzing the causes and persistence of the U.S. external deficit, a framework that draws heavily on the work that has been reviewed here.

III. Analytical Framework.

Our analysis of the causes and persistence of the U.S. external deficit adopts several of the approaches that were covered in our review of the literature in Section II. We consider macroeconomic factors, employing both partial-equilibrium analysis and general-equilibrium analysis; we also consider microeconomic factors. This section outlines these approaches in more detail than was done in Section II, and illustrates the extent to which they can be derived from a consistent analytical framework.

A. Partial-Equilibrium Analysis

The partial-equilibrium approach we adopt involves analyzing the contributions of "proximate determinants" in a structural model of the external balance. The standard structural model includes behavioral equations for the volumes and prices of imports and exports of goods and services, plus identities defining the overall balance. An example of a

fairly complete partial-equilibrium model of the U.S. external balance is provided by HH. The reduced form of this model can be written:

$$(1) \quad X - M = f(Y, Y^*, EP/P^*, Z),$$

where X-M is nominal net exports, Y and Y* are home and foreign income, EP/P* is the real exchange rate (or the nominal rate times the ratio of home to foreign prices), and Z is a vector of other factors (such as oil prices, interest rates, asset stocks and so on) that directly affect the value of trade in goods and services.

Analyzing the causes of the deficit under this approach entails quantifying the contributions of changes in each of the major proximate determinants on the right-hand side of (1), based on estimates of the structural relationships underlying this reduced-form equation. In Section V, we review the calculations made by others and add our own, based on a respecification of some of the import and export volume equations estimated by HH and KB.

B. General-Equilibrium Analysis

The general-equilibrium approach involves identifying the contributions of changes in policies and other fundamentally exogenous factors through simulations with a complete model of the world economy. Our empirical analysis in Section VI draws on the results of simulations with a number of multicountry macroeconomic models. A least common denominator for the theoretical structure of most of these models is the extended (expectations-augmented) two-country Mundell-Flemming model, as

described by Frankel (1987).[2] These models specify behavioral sectors for the supply of and demand for goods and services, money and other assets in the United States and the rest of the world, with varying degrees of aggregation and coverage of foreign countries. Current incomes (outputs), prices, interest rates, exchange rates, and capital stocks are determined endogenously. Thus, the behavioral relationships underlying the reduced-form equation above enter into the determination of U.S. and foreign demand for goods and services, and the major proximate determinants on the right-hand side of (1) are all determined endogenously.

A more thorough description and presentation of the structure of these macro models is beyond the scope of this paper. However, it would be instructive to review some of the basic GNP and balance of payments identities pertaining to the external balance that can be derived from these models. We also briefly review the process of exchange rate determination.

To begin with, the external balance, or net exports (X-M), can be viewed as the difference between domestic supply of goods and services or domestic output (Y) and domestic demand or expenditures (C+I+G):

$$(2) \quad X - M = Y - (C + I + G)$$

By rearranging (2) the external balance can also be viewed as the difference between domestic saving (income minus private and government consumption) and domestic investment:

---

2. Frankel (1988) analyzes the results of simulations with the same set of models that we employ in Section VI, and concludes that they are for the most part consistent with the predictions of the standard Mundell-Flemming model augmented to allow for varying exchange rate expectations. Frenkel and Razin (1987) present a recent review of the Mundell-Flemming model.

(3) $X - M = (Y - C - G) - I$

This relationship can be refined by adding and subtracting from the right hand side of (3) taxes (T) and transfers (TR) between the government and private sector. The external balance can then be defined as the difference between domestic investment and the sum of government saving and private saving:

(4) $X - M = [(T - G - TR) + (Y + TR - T - C)] - I$

As can be seen from (4), in the special case where private saving (Y+TR-T-C) is equal to investment, the external balance will be equal to the government budget surplus.

From the balance of payments identity, the current account, which is essentially equal to net exports minus net unilateral transfers to foreigners (TF), equals (ex-post) the change in net domestic demand for foreign assets (ΔFA) minus the change in net foreign demand for domestic assets (ΔDA^*):[3]

(5) $X - M = \Delta FA - \Delta DA^* + TF.$

In a global context, U.S. net exports are the rest of the world's combined net imports:[4]

(6) $X - M = M^* - X^*$

Thus, the identities (2)-(4) can also be viewed from the rest of the world's perspective. By adding asterisks to, and reversing the signs of the right-hand side variables of (2)-(4), U.S. net exports can be defined

---

3. The difference between the current account and GNP net exports of goods and services reflects several minor differences in statistical definitions between the balance of payments and national income accounts (in addition to the exclusion of unilateral transfers from the latter), as will be discussed in Section IV.

4. This "identity" abstracts from FOB-CIF differences (transportation costs, etc.), and expresses foreign imports and exports in dollars.

as the excess of foreign demand or expenditure over foreign supply or output:

$$(7) \quad X - M = -Y^* + (C^* + I^* + G^*),$$

or the excess of investment abroad over saving abroad:

$$(8) \quad X - M = -(Y^* - C^* - G^*) + I^*$$

$$(9) \quad X - M = -[(T^*-G^*-TR^*) + (Y^*+TR^*-T^*-C^*)] + I^*$$

In brief, U.S. net exports can be viewed as (a) U.S. excess demand (or foreign excess supply) of goods and services, (b) U.S. private and government savings net of investment (or the excess of domestic investment abroad over private and government savings abroad), or (c) U.S. net demand for foreign assets minus foreign net demand for U.S. assets. In the global general-equilibrium models we make use of in Section VI, all of these factors are jointly determined by exogenous monetary and fiscal policy variables at home and abroad, as well as by other fundamentally exogenous factors (such as autonomous shifts in private consumption or investment behavior).

C. Exchange Rate Determination

Since the behavior of exchange rates is central to our analysis of the external deficit, we outline here the model of exchange rate determination that will be used later in the paper. The model we use is real open interest parity, which is either included explicitly or approximated fairly closely in most of the global models that we will be refering to.[5] The basic assumptions of this model are: (1) perfect

---

5. See, for example, Shafer and Loopesko (1983) and Hooper (1985) for descriptions of this model.

substitutability of assets denominated in different currencies, (2) absence of foreign exchange risk (or risk aversion) and (3) a constant expected long-run equilibrium level of the real exchange rate (q_t^e). Under assumptions (1) and (2), open interest parity holds:

$$(10)\quad s_t^e - s_t = \gamma(i_t^* - i_t)$$

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[6]

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

Under assumption (3), the expected value of the nominal spot exchange rate (s_t^e) in the long run (γ years ahead) is defined:

$$(11)\quad s_t^e = p_t^{*e} - p_t^e + q_t^e$$

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. Substituting current price levels and expected average annual rates of inflation (π) for expected future prices levels in (11), we have:

$$(12)\quad s_t^e = p_t^* + \gamma\pi_t^{*e} - (p_t + \gamma\,\pi_t^e) + q_t^e$$

Substituting the right hand side of (12) for s_t^e in (10), and rearranging yields:

$$(13)\quad s_t - p_t^* + p_t = q_t^e + \gamma(i_t - \pi_t^e - i_t^* + \pi_t^{*e}),$$

---

6. The interest rates in (10) - (13) are implicitly divided by 100, given that the exchange rates are expressed as logarithms and the scale factor γ is expressed in number of years.

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. We will return to an empirical analysis of this model in Section VI.

D. Price Determination

One factor contributing to the persistence of the current account deficit is the behavior of non-oil import prices in dollar terms. In this subsection we set out a simple model of price determination in imperfectly competitive markets that allows for variation in profit margins and that incorporates the possible effects of protection.

Equation (14) shows, in an accounting sense, the relationship between dollar import prices, foreign prices, and the exchange rate:

$$(14) \quad P_i^{\$} = P_i^* / E_i$$

where, P_i^* is the foreign-currency price of a product produced by a foreign firm and exported to the United States, $P_i^{\$}$ is the import price in dollars, and E_i is the product-specific foreign currency/dollar exchange rate. If the foreign price remains unchanged, a change in the exchange rate will be fully passed through to the dollar import price.

Next, assume that the foreign-currency price of the product equals the marginal cost of production, C_i^*, in foreign currency, times a markup factor, λ, which is equal to one plus a percentage profit margin:

$$(15) \quad P_i^{\$} = C_i^* * \lambda_i / E_i$$

Under perfect competition, where the foreign firm faces infinitely elastic demand, λ_i equals 1.0. But, perfect competition is unlikely to accurately reflect the market structure of most traded goods, because of

the heterogeneity of many products (particularly manufactured goods), and because of the presence of quantitative restraints on many of the products.

A plausible behavioral characterization of (15) can be written:

(16) $P^{\$} = C^{*}(I(w,r,k),E,Q)) * \lambda(E,Q,Y) / E$

where the product subscript i has been suppressed.

Marginal cost is a function of input costs (I), which is a function of productivity adjusted wages, (w), raw material costs, (r), and capital costs (k); the exchange rate E, to the extent that imported intermediates are used in the production process; and the quantity produced (Q), to the extent that there are economies of scale or scope. The markup is a function of (1) the exchange rate E, which proxies for the degree of competition from home firms in the import market, (2) the quantity produced (which in the presence of quantitative import restraints may differ from the equilibrium quantity demanded), and (3) shifts in demand, Y, associated with changes in income, tastes and so on.[7]

Log differentiation of (16) yields (17), which expresses the percent change in the dollar import price as a function of changes in the input costs, the exchange rate, the quantity produced, and exogenous shifts in demand, given the elasticities of marginal cost and the markup with respect to the exchange rate, quantity produced and demand shifts:

(17) $\hat{P}_i^{\$} = (\eta_c^I)\ \hat{I} + (\eta_c^e + \eta_\lambda^e - 1)\ \hat{E} + (\eta_c^q + \eta_\lambda^q)\ \hat{Q} + \eta_\lambda^y\ \hat{Y}$

where,

---

7. For a more formal derivation of the model, see Mann (1984).

η_c^I = $\delta C/\delta I$ I/C measures the responsiveness of marginal cost to changes in input costs, which may depend on institutional structure in the labor and capital markets.

η_c^e = $\delta C/\delta E$ E/C varies with the importance of imported inputs.[8]

η_λ^e = $\delta \lambda/\delta E$ E/λ is the elasticity of the markup (measured in foreign currency) with respect to exchange rate changes.

η_c^q = $\delta C/\delta Q$ Q/C, measures the slope of the marginal cost curve.

η_λ^q = $\delta \lambda/\delta Q$ Q/λ, measures changes in the markup along the demand curve.[9]

η_λ^y = $\delta \lambda/\delta Y$ Y/λ, measures changes in the markup as the demand curve shifts.[10]

This simple model points to several sources for "persistence" in the U.S. external deficit. One aspect of persistence is a slower than expected adjustment of import prices and import volumes to the fall in the dollar.[11] In this model of imperfect competition, any given decline in the foreign exchange value of the dollar, will lead to less of an

---

8. In the case of Cobb-Douglas production, this would be the share of imported intermediates into the production process.

9. The elasticity of the demand curve can be affected by the number of firms in the market, which may in itself be a function of the exchange rate -- see Baldwin (1986), and by the rate of change in demand for the product -- see Mann (1986).

10. In the case of constant elasticity demand, both of this elasticity and the one above are zero, since by definition, the elasticity of demand does not change.

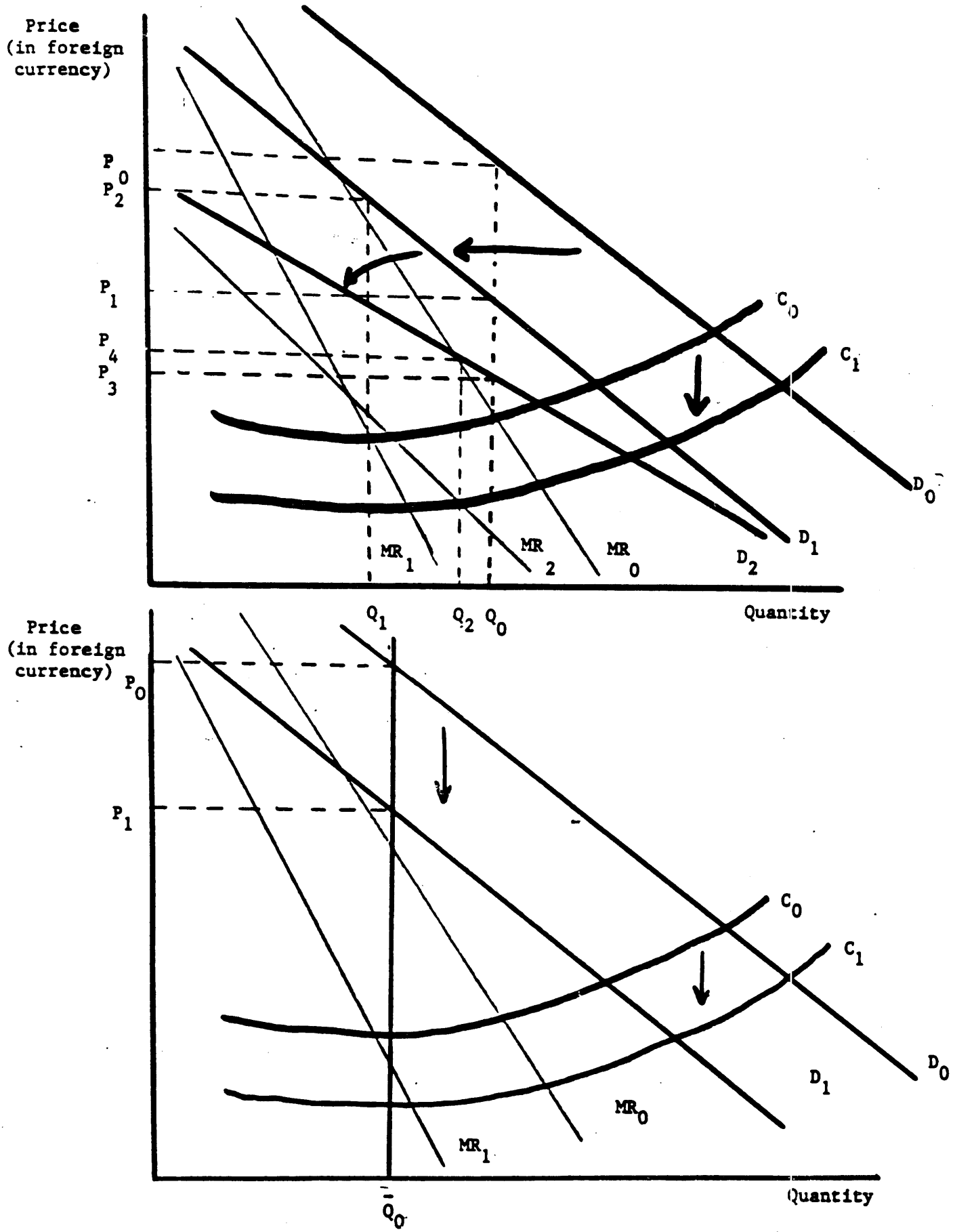
11. Slow adjustment of import prices does not necessarily explain persistence of the nominal trade deficit, since the weakness in import prices, if anything, tends to depress the nominal deficit initially. Moreover, even if import prices were rising, with a price elasticity of demand in the neighborhood of unity, volumes would eventually fall enough to offset the rise in price, leaving nominal imports about unchanged. Nevertheless, the slow adjustment of import prices is an important factor underlying the persistence of the deficit in real terms. It may also be indicative of foreign pricing behavior in U.S. export markets, which has important implications for exports in both real terms and nominal terms.

increase in dollar import prices to the extent that foreign profit margins or production costs are reduced. On the other hand, if at the same time that the exchange rate moves, quantitative restraints are tightened, there may be no apparent relationship between exchange rate changes, and dollar import prices, and from there to import volumes.

Some of these effects are illustrated in the top panel of Figure 1, which shows price determination for a foreign firm selling a differentiated product in the U.S. market. Initially the firm is selling the quantity Q_0 at a foreign-currency price P_0. Suppose the foreign currency appreciates against the dollar. This exchange rate change shifts the U.S. demand curve facing the foreign firm to the left, from D_0 to D_1. The firm can now continue to sell the quantity Q_0 at a substantially lower price (and profit margin), P_1, or it can sell less (Q_1), with a smaller reduction in profits, at price P_2. The exchange rate change will also induce U.S. competitors to enter the market, thereby increasing the elasticity of demand for the foreign firm's product, and flattening the demand curve to D_2. This would lead to a further reduction in price (and profit margins) if the firm continued to sell quantity Q_0. The exchange rate change may also reduce the firm's raw material input costs, moving the marginal cost curve from C_0 to C_1 In this case, the firm may either regain some of its lost profits or further reduce its price and regain some of its lost market share. Overall, any reduction in the foreign currency price means that some portion of the exchange rate change is absorbed, yielding a smaller increase in the dollar import price than would be predicted by the simple relationship in equation (14). The degree of such absorption can vary widely, depending on the circumstances.

Figure 1

Dollar Depreciation and Foreign Price Determination



Next, suppose that imports of the foreign product are subject to a quantitative restriction at the time of the exchange rate change, as illustrated in the bottom panel of the figure. If the restriction was binding and the foreign firm had set its price well above the unrestricted profit maximizing level, it could be in a position to absorb the full amount of the exchange rate change, reducing its foreign-currency price from P_0 to P_1, and leaving the dollar price and the quantity sold unchanged. If the quantitative restrictions were tightened while the exchange rate change was taking place, it should be clear that the price would be higher and the quantity sold lower than the final outcome shown in the bottom panel of the figure. Finally, if U.S. demand were rising, due to an increase in income for example, the price would be higher than the final outcome shown in the bottom panel of the figure, and both the price and quantity would be higher than the final outcome shown in the top panel of the figure.

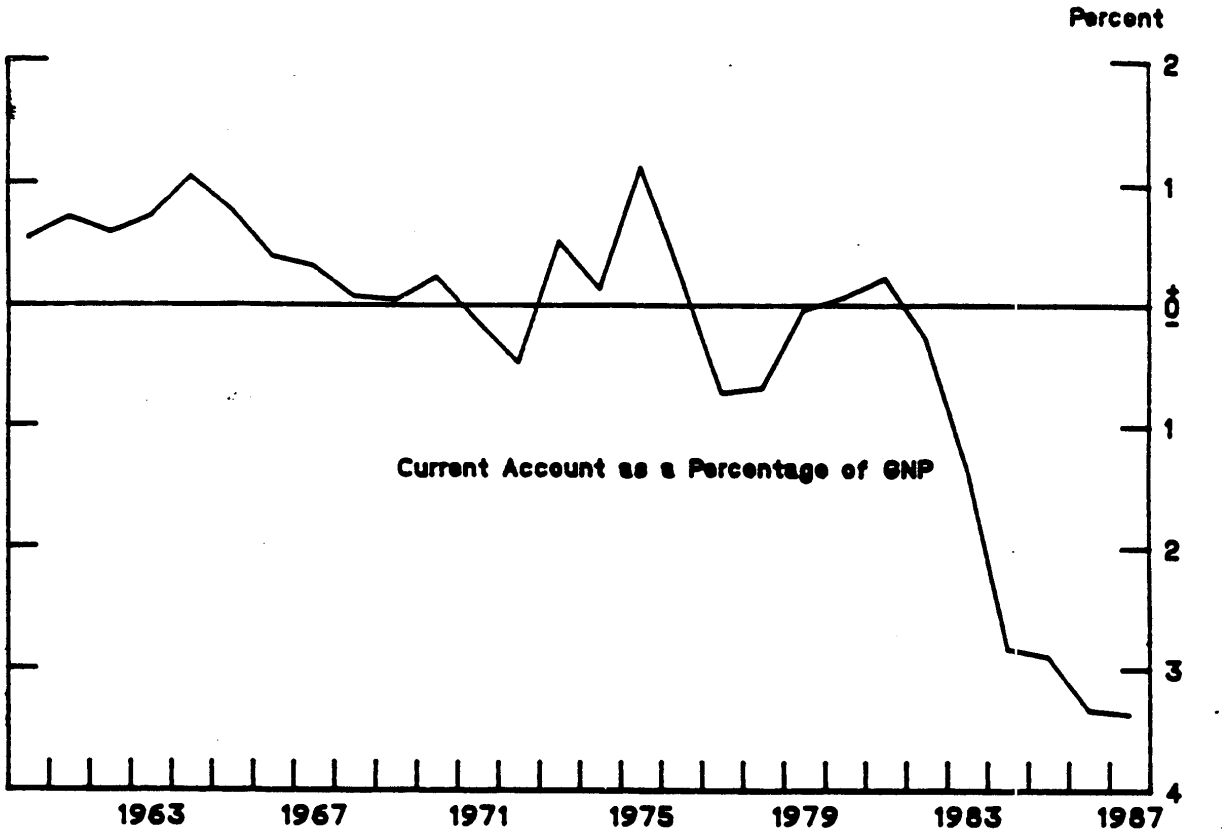
We turn next to our empirical analysis.

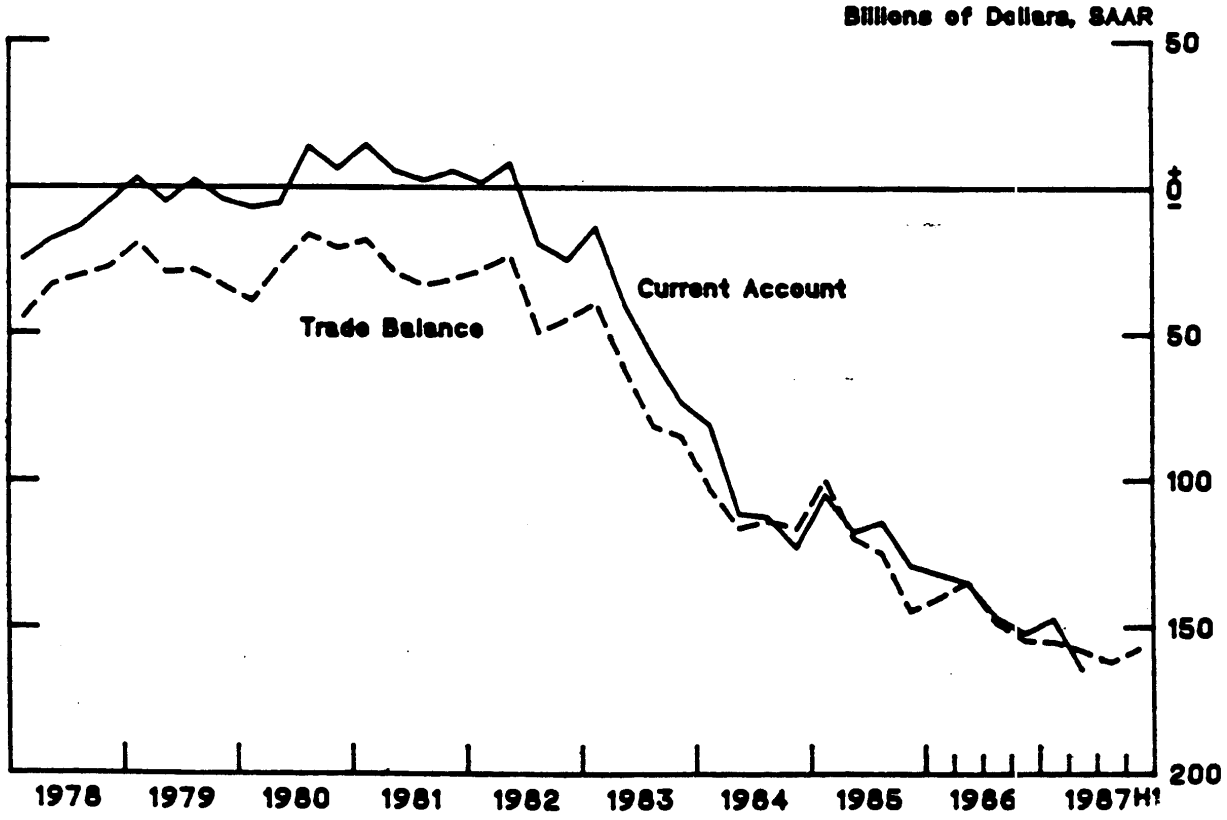
IV. The Anatomy of the External Deficit: Data Review

This section reviews the facts about the emergence of the external deficit and its persistence in the 1980s. Chart 1 provides an historical perspective. After fluctuating well within a range of plus or minus 1 percent of GNP during most of the preceding three decades, the current account plunged to a deficit of more than 3-1/2 percent of GNP during the first half of the 1980s. The rate of decline was greatest during 1982-84 as U.S. growth recovered strongly from the 1982 recession. The deficit continued to widen through mid-1987, although at a noticeably

Chart 1

U.S. External Balances





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

slower pace than had been the case earlier. As indicated in the bottom panel of the chart, the bulk of the decline in the current account reflected a widening of the trade deficit. Net services and transfers, shown as the shaded area, narrowed from a comfortable surplus in the early 1980s to about a zero balance in 1986 and the first half of 1987, contributing significantly further to the widening of the current account deficit.

A. Nominal and Real Net Exports

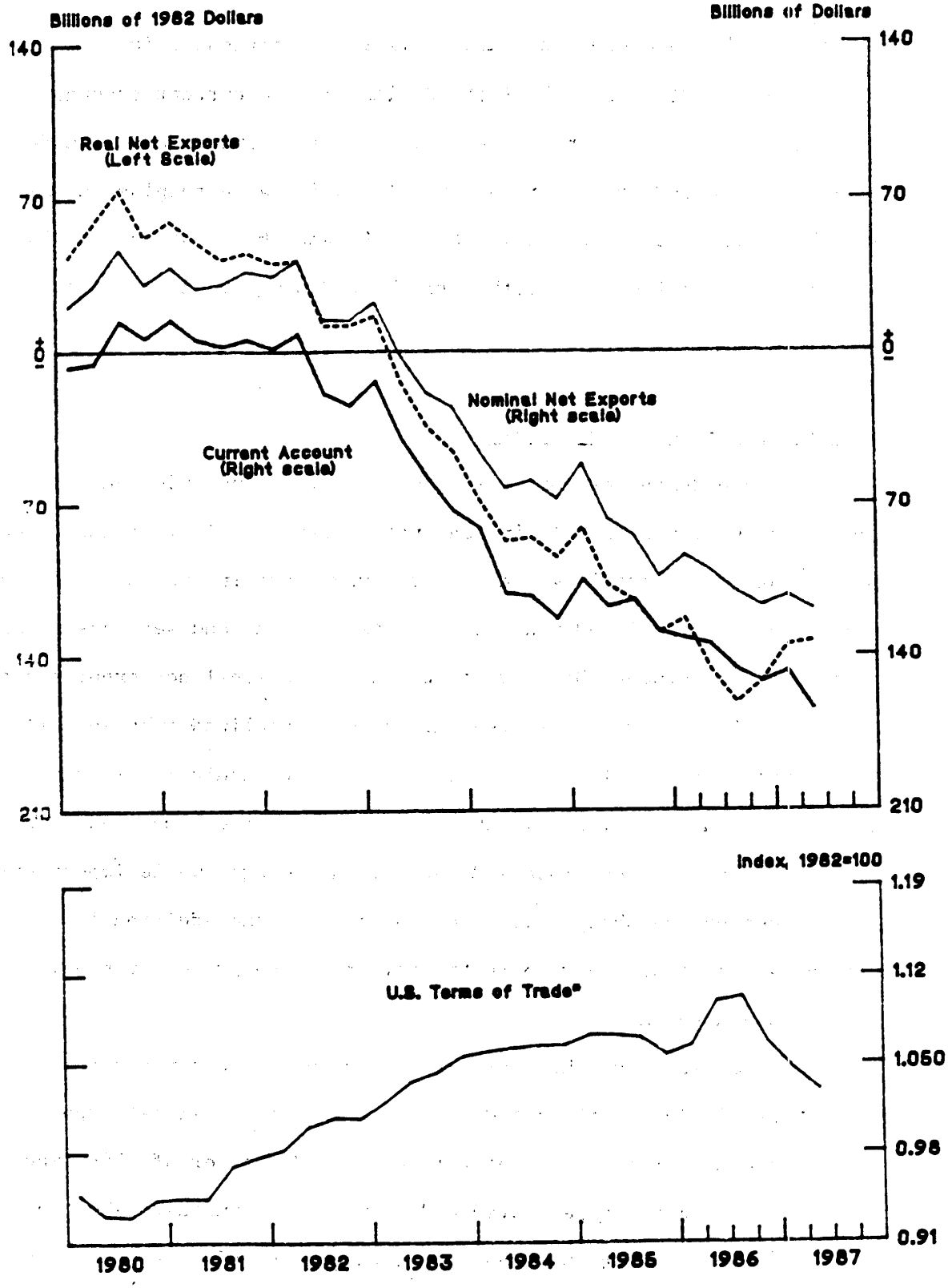
The widening of the deficit between 1980 and 1986 can be more than accounted for by a fall in real net exports. This is illustrated in the top panel of Chart 2, which compares movements in the current account with those in nominal and real net exports of goods and services. While the difference between the current account and nominal net exports has been fairly stable over time, real net exports declined substantially more between 1980 and 1986 than either of the two nominal balances. As indicated in the bottom panel, the U.S. terms of trade improved over this period, as export prices rose moderately, on average, while import prices were reduced by the sharp fall in oil prices and the additional depressing effect of the rise in the dollar on the prices of nonoil imports (see also Table 1).

More recently, the real deficit has begun to deviate from the nominal deficit in a different direction. That is, real net exports have begun to trend up from a low point in the third quarter of 1986, whereas the nominal deficit has persisted and even widened further. Most of the rise in real net exports between the third quarter of 1986 and the second quarter of 1987, reflected a drop in the volume of oil imports, which had

Chart 2

U.S. Nominal and Real External Balances

(S.A.A.R)



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

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

Table 1

U.S. Trade Prices and Quantities by Major Component
(Seasonally adjusted annual rates)

	1980	1986	1986H1	1987H1	Change 1980-1986 Billions of $	Change 1980-1986 Percent	Change 1986H1-1987H1 Billions of $	Change 1986H1-1987H1 Percent
Imports								
Total Goods and Services:								
1. Value (bil. $)	319	482	470	520	+163	+51	+50	+11
2. Quantity (bil. 1982 $)	332	523	505	535	+191	+58	+30	+6
3. Price (1982=100)	96	92	93	97		-4		+4
Goods:								
Nonoil								
4. Value (bil $)	170	335	323	353	+165	+97	+30	+9
5. Quantity (bil 1982 $)	173	345	340	353	+172	+99	+13	+4
6. Price (1982=100)	99	97	95	100		+2		+5
Oil								
7. Value (bil $)	79	34	36	37	-45	-58	+1	+3
8. Quantity (bil 1982 $)	83	72	65	70	-11	-13	+5	+8
9. Price (1982=100)	96	47	55	53		-51		-4
Exports								
Total Goods and Services:								
10. Value (bil. $)	351	376	372	404	+25	+7	+32	+9
11. Quantity (bil. 1982 $)	389	376	372	404	-13	-3	+32	+9
12. Price (1982=100)	90	100	100	100		+11		0
Goods:								
Nonagricultural								
13. Value (bil $)	182	197	195	207	+15	+8	+12	+6
14. Quantity (bil 1982 $)	202	212	210	225	+10	+5	+15	+7
15. Price (1982 = 100)	90	93	93	92		+3		-1
Agricultural								
16. Value (bil $)	42	27	27	27	-15	-36	0	0
17. Quantity (bil 1982 $)	39	30	28	32	-9	-23	+4	+14
18. Price (1982 = 100)	108	90	95	84		-17		-12
Net Services:								
19. Value (bil. $)	55	37	38	37	-18	-33	-1	-3

Source: Bureau of Economic Analysis, Survey of Current Business; all value data are from the U.S. Balance of Payments Accounts. Prices are deflators from the National Income and Product Accounts. Components may not sum to totals due to rounding.

risen to unusually high levels in the summer of 1986 as oil import prices bottomed out, and were depressed thereafter as prices rebounded. Thus, excluding oil imports, the recent quarterly pattern of real net exports shows only a slight upward movement (as we will see in Chart 5). The nominal deficit has continued to widen, however, because the terms of trade have turned down over the recent period, as oil prices have rebounded and the prices of nonoil imports have begun to respond to the depreciation of the dollar, while export prices have remained relatively stable. Although not shown on the table, the nominal and real trade deficits appear to have widened somewhat further in the third quarter -- based on data for July and August -- due largely to an apparently transitory reemergence of strong oil imports related to domestic stockbuilding.

The data in Table 1 indicate that the fall in real net exports between 1980 and 1986 was accounted for by a doubling of the volume of nonoil imports (line 5), while the volume of exports (lines 11, 14 and 17) remained little changed. Of the $204 billion (1982 prices) decline in real net exports over that period, a fall in the real partial trade balance (merchandise excluding agricultural exports and oil imports) accounted for 80 percent of the total, and a decline in real net services accounted for the remainder. The volumes of agricultural exports and oil imports both declined by $9 billion. Both the real trade balance and real net exports of goods and services were about unchanged between the first half of 1986 and the first half of 1987. This leveling-off of the deficit in real terms reflects a substantial pickup in export growth, while import growth slowed significantly (but remained positive).

B. Trade by Area

The widening of the deficit between 1980 and 1986 was dispersed across major U.S. trading partners. (See Table 2.) All regions increased their nonoil exports to the United States at substantial rates, with those from Japan and other Asian countries (lines 10 and 12 in the table) showing the most spectacular growth. The growth of U.S. exports to most areas was stagnant by comparison, with exports to Latin American countries and other developing countries (particularly those with international debt problems) as well as Western Europe showing noticeable net declines. Only in the case of trade with Canada did the growth rate for U.S. exports approach half the rate of growth of imports. Exports to Japan also rose, but much of this increase between 1980 and 1986 reflected a temporary bulge in gold shipments in mid-1986.[12]

In the past year, the growth of imports from industrial countries has slowed substantially, while imports from developing countries have continued to advance at healthy rates, and in some cases have actually accelerated. This pattern is consistent with the much greater decline in the dollar in real terms that has occurred against the currencies of industrial countries than against the currencies of developing countries over the past two and a half years (as we will be discussing in Section VI). The rebound in exports since the first half of 1986 has been concentrated in shipments to Western Europe and

---

12. In the first half of 1986 Japan trans-shipped nearly $5 billion (at an annual rate) in gold through the United States. These transactions had the effect of raising recorded U.S. exports of gold to Japan by that amount, while raising recorded U.S. imports of gold from other countries by about the same amount.

Table 2

U.S. Merchandise Trade by Region 1980-1987H1

	Levels (Billions of $, SAAR)				Average Annual Rates of Change (%)	
	1980	1986	1986H1	1987H1	1980-86	1986H1-87H1
Total Exports To:						
1. All Regions	224.3	224.4	221.6	234.0	0	5.6
Selected Industrial Countries:						
2. Canada	41.6	57.0	57.9	60.4	6.2	4.3
3. Japan	20.8	26.4	26.0	24.3	4.5	-6.5
4. Western Europe	67.6	60.7	59.5	66.9	-1.7	12.4
Selected Developing Countries:						
5. Asia*	14.2	17.3	16.5	20.1	3.6	21.8
6. Latin America	38.8	30.9	29.5	31.6	-3.4	7.1
7. Rest of World	41.3	32.1	32.2	30.7	-3.7	-4.7
Non-Oil Imports From:						
8. All Regions	170.5	334.9	322.8	353.1	16.1	9.4
Selected Industrial Countries:						
9. Canada	38.8	65.9	66.4	68.6	11.6	3.3
10. Japan	31.2	80.7	76.6	81.4	26.4	6.3
11. Western Europe	42.7	85.0	83.3	87.7	16.5	5.3
Selected Developing Countries:						
12. Asia*	17.7	45.7	40.7	53.2	26.4	30.7
13. Latin America	18.9	30.6	30.7	32.7	10.3	7.2
14. Rest of World	21.2	27.0	25.1	29.3	4.5	16.7

SOURCE: Bureau of Economic Analysis, Survey of Current Business; U.S. Balance of Payments Accounts.

* Asia includes Hong Kong, Singapore, Taiwan, and Korea.

developing countries in Asia, while shipments to Canada have continued to grow steadily.

C. Trade by Commodity Group

By major end-use commodity group (Table 3), business machinery was the only category to show any noticeable export growth in real terms over the 1980-86 period, and has continued to grow strongly over the past year. Most other categories of exports showed declines in real terms over the first half of the 1980s. Some categories of industrial supplies (notably paper and wood products), agricultural goods and consumer goods have contributed, along with machinery, to the strengthening of exports more recently.

Among nonoil imports, capital goods showed the strongest growth, tripling in volume between 1980 and 1986, with business machinery accounting for a significant portion of the total. Consumer goods and autos doubled in volume, while imports of food and nonoil industrial supplies grew at somewhat slower rates. The growth in real imports of all categories has slowed substantially in the past year, although imports of capital goods and to a lesser extent consumer goods (significantly business machinery and consumer goods from Asian countries other than Japan) have continued to grow fairly briskly. Industrial supplies and materials is the only major import category to have shown a decline in the past year.

D. Net Services

While most of the decline in real net exports is accounted for by the fall in the real merchandise trade balance, a decline in net

Table 3

U.S. Merchandise Trade Volumes and Prices by Major Commodity Group

Volumes	Levels				Average Annual Rate of Change	
	1980	1986	1986-H1	1987-H1	1980-1986	1986H1-1987H1
	(billions of 1982 $)				(percent)	
Exports						
Foods, Feed, and Beverages	33.0	25.7	24.5	27.6	-3.7	12.7
Industrial Supplies and Materials	68.1	63.5	60.8	68.9	-1.1	13.3
Capital Goods	87.1	94.2	90.9	100.6	1.4	10.7
Business Machines	8.3	35.0	32.6	40.8	53.6	25.2
Automotive	21.6	22.7	23.9	22.9	0.9	-4.2
Consumer Goods	17.7	14.0	13.3	16.2	-3.5	21.8
Non-oil Imports						
Foods, Feed, and Beverages	16.1	22.9	22.3	23.7	7.0	6.3
Industrial Supplies and Materials	47.2	72.8	71.6	73.0	9.0	2.0
Capital Goods	31.2	93.3	89.7	100.3	33.2	11.8
Business Machines	4.1	35.0	31.6	41.7	125.6	32.0
Automotive	33.2	66.3	64.2	67.4	16.6	5.0
Consumer Goods	34.9	74.1	71.7	76.3	18.7	6.4
Prices[1] (1982=100)						
Exports						
Foods, Feed, and Beverages	108.1	88.0	92.4	81.5	-3.1	-11.8
Industrial Supplies and Materials	99.5	91.6	93.3	93.1	-1.3	0.2
Capital Goods	86.7	98.2	97.9	99.8	2.2	1.9
Business Machines	109.4	47.9	47.3	45.1	-9.4	-4.7
Automotive	81.5	112.4	111.6	113.7	6.3	1.9
Consumer Goods	95.0	103.0	102.3	105.6	1.4	3.2
Non-oil Imports						
Foods, Feed, and Beverages	112.8	105.0	105.3	101.9	-1.1	-3.2
Industrial Supplies and Materials	103.1	84.4	84.3	86.8	-3.0	3.0
Capital Goods	100.2	92.5	90.4	98.6	-1.3	9.1
Business Machines	109.4	46.9	47.3	45.1	-9.5	-4.7
Automotive	84.1	117.7	114.8	123.6	6.7	7.7
Consumer Goods	98.7	104.9	102.9	111.5	1.1	8.4

Source: Bureau of Economic Analysis, Survey of Current Business, National Income and Product Accounts; Business Machines: Bureau of Economic Analysis. All data at a seasonally adjusted annual rate.

1/ Prices are GNP fixed weight deflators.

services also contributed. In real terms, net services fell by about $39 billion at an annual rate between 1980 and 1986.[13] As indicated in line 19 of Table 1, the decline in current dollars was somewhat less, and the balance on net services has remained significantly positive. Movements in the major components of net services are shown in the top panel of Chart 3. The investment income accounts have shown divergent movements. Net portfolio income fell off noticeably between 1980 and 1986, while net direct investment income actually rose, despite an $80 billion deterioration in the U.S. net direct investment stock position over that period.[14] Changes in net direct investment income have been dominated by changes in capital gains associated with the impact of swings in the dollar's exchange rate on the valuation of assets and liabilities denominated in foreign currencies. In addition, the dollar value of U.S. income flows denominated in foreign currencies was falling as the dollar appreciated over the first half of the 1980s and has risen sharply since the dollar began to depreciate in early 1985.

The decline in net portfolio income has followed more closely the pattern of decline in the U.S. overall net foreign investment position, shown in the bottom panel of the chart. More than three-fourths of the $370 billion deterioration in the U.S. net investment position between 1980 and 1986 reflected increasing net foreign portfolio claims on the United States. This shift occurred as U.S. banks reduced

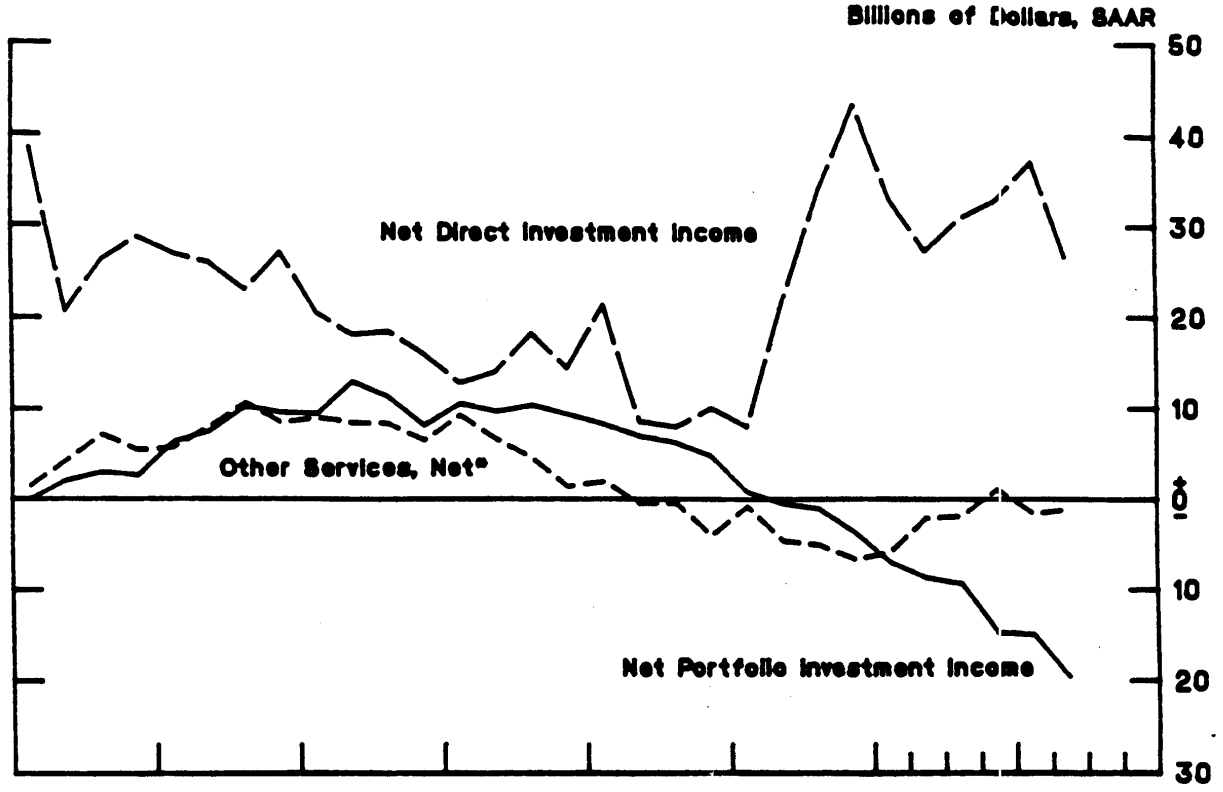
---

13. On a GNP basis, real net services were $68.7 billion in 1980, $29.7 billion in 1986, and $30.2 billion (at an annual rate) in 1987H1.

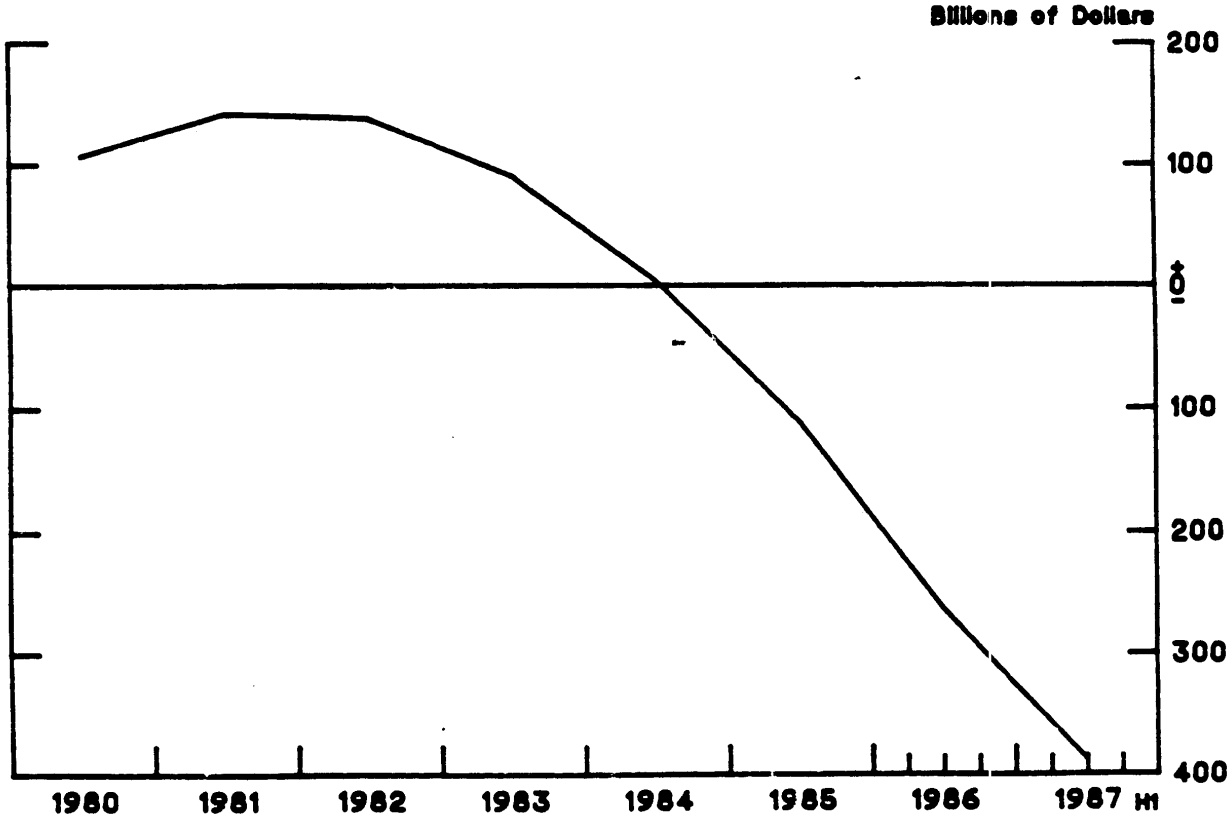
14. Foreign direct claims on the United States rose by about $125 billion between 1980 and 1986, while U.S. direct claims on foreigners rose by only about $45 billion on a book value basis. See U.S. Department of Commerce, Survey of Current Business, June 1987, p. 40.

Chart 3

U.S. Service Account Transactions



U.S. Net Foreign Investment Position**



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

* Includes net military transactions as well as travel, transportation, and other services.
** Stock position 1987H1 is an estimate based on the recorded position as of end-1986 plus the U.S. current account balance during 1987H1.

their net claims on foreigners, as foreign private residents invested heavily in U.S. government and corporate securities, and, more recently, as foreign official agencies have increased their holdings of dollar assets in the United States due to intervention to support the dollar. Nevertheless, the decline in net portfolio income between 1980 and 1986 (a little over $10 billion at an annual rate) was small relative to the nearly $300 billion decline in our net portfolio investment position. This apparent discrepancy reflects the fact that the average recorded rate of return on U.S. portfolio liabilities to foreigners is less than that on U.S. assets held abroad and that both assets and liabilities have continued to grow during this period. The combination of higher gross stocks and differential rates of return was apparently enough to more than offset the effects of a declining net foreign asset position.[15]

Other services, net, including travel, transportation, and so on, fell by roughly ($10) billion dollars between 1980 and 1985, but have rebounded since 1985, reflecting the effects of the decline in the dollar, among other factors.

---

15. The discrepancy in average rates of return reflects several factors. First, U.S. bank-reported claims and liabilities account for a significant portion of gross U.S. claims and liabilities, and banks are intermediaries who make income on their portfolios by charging higher rates of interest on their loans to foreigners than they do on their liabilities to foreigners. In addition, receipts include substantial fee income earned by U.S. banks for services provided to foreigners. Second, the recorded return on corporate stocks does not include capital gains and therefore is relatively low (primarily reflecting dividend payments). Foreign holdings of U.S. stocks are more than three times as great as U.S. holdings of foreign stocks. Moreover, increases in foreign holdings of U.S. stocks net of U.S. holdings of foreign stocks accounted for about one-fourth of the total decline in the U.S. net portfolio investment position over the 1980-86 period. See Helkie and Stekler (1987) or Helkie and Hooper (1987) for more on the relative rates of return on U.S. international claims and liabilities.

V. Macroeconomic Causes: Partial-Equilibrium Analysis.

As we noted in the preceding section, the widening of the U.S. external deficit during 1980-86 was more than accounted for by the decline in real net exports over that period. In this section we first consider the factors that contributed to the decline in real net exports, in a partial-equilibrium framework. We then analyze the extent to which this analytical framework can explain the persistence of the deficit more recently, focusing in particular on the recent behavior of aggregate import prices.

A. Income and Relative Prices

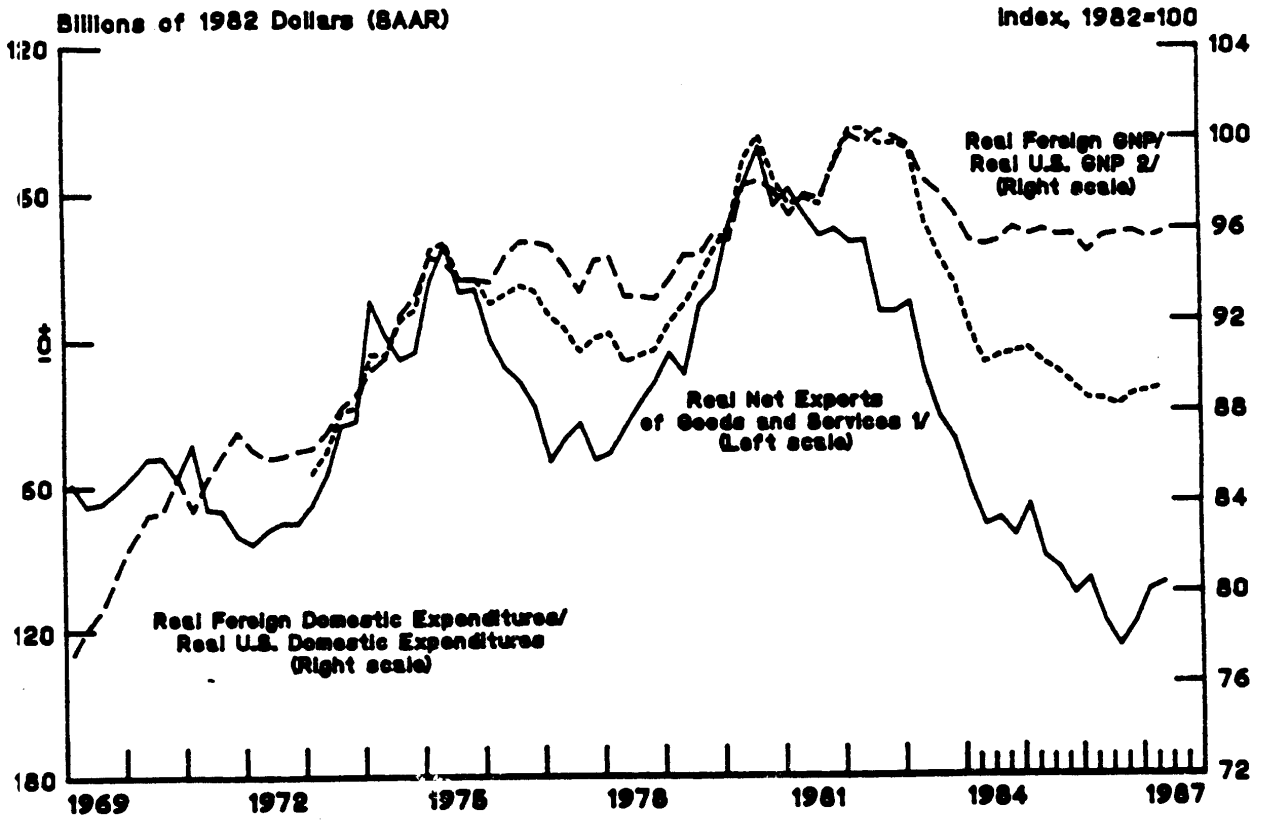
As was discussed in Section IV, the major determinants of changes in real net exports are the relative growth of real income or expenditure at home and abroad, and the relative prices of goods and services produced at home and abroad. Chart 4 shows a comparison of real net exports with various measures of relative growth and relative prices over the past two decades. The top panel shows two measures of relative activity compared with net exports, and the bottom panel shows a measure of relative prices compared with net exports. In order to make net exports comparable with the other indicators in the chart over the entire period shown, they have been normalized by trend growth in real U.S. trade during 1969-86.[16]

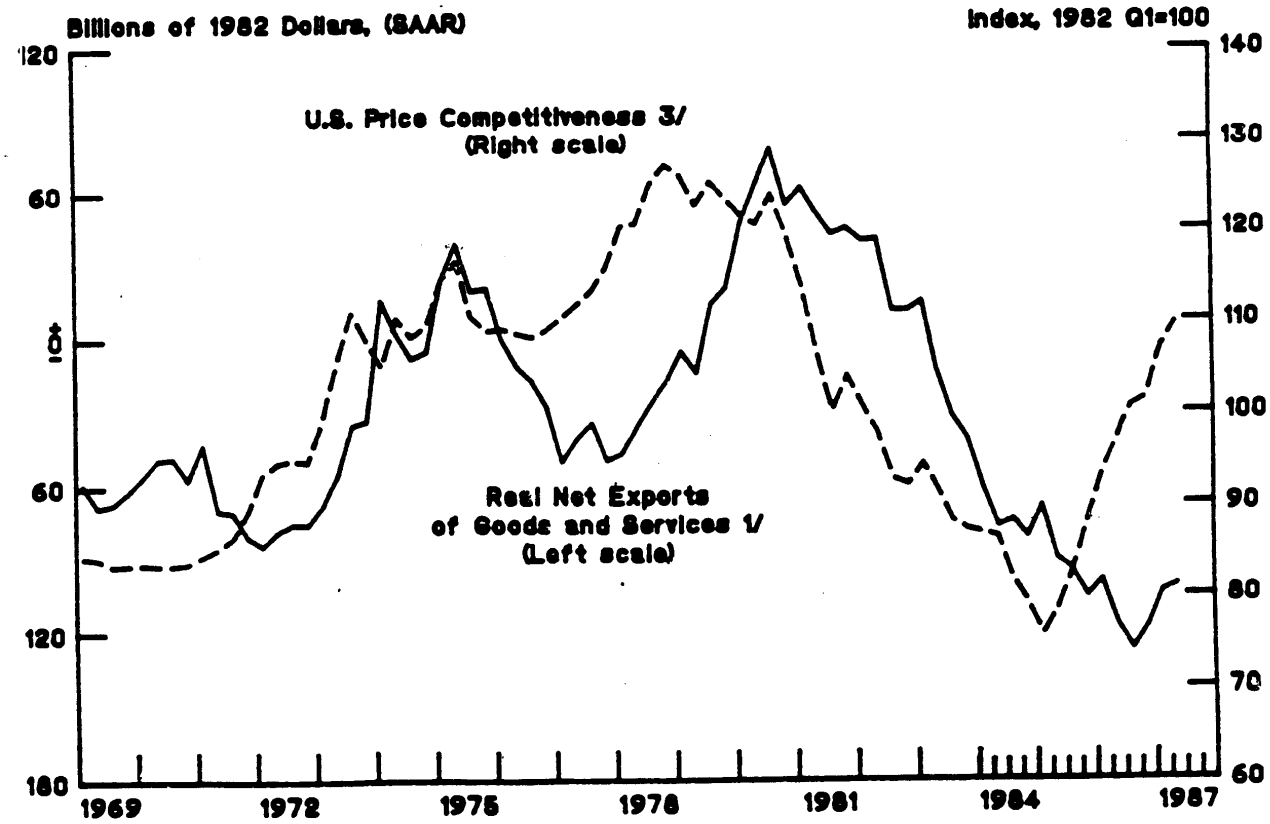
---

15. Between 1969 and 1986 (the period covered in the chart), the U.S. total 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.

Chart 4

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 dev. countries (in dollars) to U.S. consumer prices. Foreign prices are weighted by multilateral trade shares.

The two measures of relative real activity in the top panel are GNP and domestic expenditures (C+I+G).[17] Foreign and U.S. GNPs (or total outputs) are the more appropriate activity variables for the nearly 50 percent of U.S. exports and imports that can be classified as intermediate goods. Total domestic expenditures (or final demand) may be more appropriate for the rest of U.S. trade, which can be classified as finished goods. As indicated by the chart, in the early 1970s and again in the late 1970s, significant increases in real net exports coincided with substantial increases in foreign activity relative to U.S. activity. The increase in the level of U.S. activity relative to foreign activity since 1980 contributed to the decline in real net exports over that period.

The measure of relative prices shown in the bottom panel is the ratio of an index of consumer prices in dollars of major foreign industrial and developing countries to U.S. consumer prices. (As is discussed in Section VI below, movements in this index of relative prices have been dominated by swings in the dollar's exchange rate against the currencies of G-10 countries over the past two decades.) The chart indicates that the increases in real net exports in both the early 1970s and latter 1970s followed significant increases in this crude measure 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 apparent bottoming-out of real net exports in the

---

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

third quarter of 1986 came about a year and a half after the peak in the dollar and the low point in U.S. price competitiveness.

This chart provides a qualitative indication of the relative contributions of the factors shown to the widening of the deficit after 1980. Movements in relative prices clearly have been strongly correlated with that in net exports (with a lag); between the activity variables, the ratio of domestic expenditures appears to have been more closely correlated than that of GNPs. The latter comparison is potentially misleading, however, inasmuch as GNPs and domestic expenditures are both influenced by net exports, and in opposite directions. A fall in net exports stimulated by a decline in U.S. price competitiveness, for example, will tend to increase U.S. domestic expenditures relative to foreign domestic expenditures, and at the same time reduce U.S. GNP relative to foreign GNP. In these instances, the expenditure ratio in the top panel of the chart will be more closely correlated than the GNP ratio with net exports (as it was during 1981-86), but only because the direction of causation has been reversed from that intended in the chart. This example illustrates the pitfalls of partial-equilibrium accounting exercises to assign causation among jointly-determined variables. It also signals potentially significant simultaneous equation bias in the estimation of standard trade equations during periods when trade volumes are responding significantly to factors other than income. Having confessed our sins in advance, we now turn to our quantitative analysis using these very same techniques.

Table 4 quantifies changes in the income and relative price determinants of the key components of real net exports that took place from 1980 to 1986 and from 1986H1 to 1987H1. The increase in U.S. GNP

Table 4

Changes in the Volume of Imports
(Average annual rates, percentage points)

		12 Quarters 1986-Q3 / 1983-Q3	2 Quarters 1987-Q1 / 1986-Q3
1.	Total Imports	15	-5
2.	Oil	7	-36
3.	Nonoil	18	4
4.	Food	8	-1
5.	Industrial Supplies	10	8
6.	Capital Goods	32	1
7.	Business Machines	56	13
8.	Other Capital Goods	23	-6
9.	Automotive	21	0
10.	Consumer Goods	18	6

exceeded that in foreign GNP over the 1980-86 period by only 2 percentage points, whereas the difference in total growth of real domestic expenditures was on the order of 10 percentage points. Over the past year, U.S. growth by either measure has been slightly below foreign growth. The price of U.S. nonagricultural exports relative to foreign consumer prices in dollars actually fell between 1980 and 1986, largely because of the dollar's depreciation during 1985-86. The relative price of exports had risen by about 30 percent between 1979 and the dollar's peak in early 1985. (Given that export volumes respond with a significant lag to relative price changes, the increase in relative prices over the earlier interval is more appropriate for analyzing what happened to exports through 1986.) Meanwhile, the price of nonoil imports fell by 30 percent relative to the U.S. GNP deflator over both 1980-86 and 1979-85Q1. In the past year the falling dollar has had a significant impact on the relative price of exports, but it has had very little effect on the relative price of imports.

Table 5 presents estimates of the implications of the changes in relative economic activity and relative prices over the first half of the 1980s for the decline in U.S. real net exports. These estimates were obtained from the Helkie-Hooper and Krugman-Baldwin studies. HH found that the $165 billion decline in the real partial trade balance (excluding oil imports and agricultural exports) between 1980 and 1986 can be attributed largely to the decline in U.S. price competitiveness. They used GNPs as the key activity variables in their import and export equations, and found that the U.S.-foreign growth difference explains only a relatively small part of the widening of the partial trade deficit. In contrast KB, who used domestic expenditure variables,

Table 5

Sources of the Real Trade Deficit

	Real Trade Balance (Billions of 1982 dollars)	
	Total	Excl. Ag. Exports and Oil Imports
1. Helkie-Hooper (1987)		
Contribution to Change in Real Trade Balance 1980-1986 of:		
A. Changes in the levels of U.S. and foreign real GNP 1980-86	-42	-18
B. Changes in relative prices of exports and nonoil imports 1980-86	-131	-121
C. Changes in other (secular) supply factors	-26	-26
D. Lagged response to oil price shock (conservation and increased production)	+37	--
E. Other	-4	0
F. Total (Change 1980-86)	-166	-165
2. Krugman-Baldwin (1987)		
Contribution to Level of Real Trade Balance in 1986Q4 of:		
A. Deviation of U.S. and foreign domestic demand growth from an average annual rate of 2.5% 1980Q1-1986Q4	--	-49
B. Change in the dollar in real terms from its 1980Q1 level	--	-63
C. (Other factors)	--	(-26)
D. Total (Level 1986Q4)	--	-138

attributed a substantially larger amount of the deficit to the growth difference. KB did find that nearly half of the real trade deficit at the end of 1986 can be attributed to movements in the dollar's real exchange rate, but their quantitative estimate of that effect appears to be only a little over half as large as the HH estimate. Part of this difference might be due to the fact that KB considered a more recent period (1986Q4, compared with HH's 1986 year average), over which the dollar was falling and offsetting some of the estimated contribution of its earlier rise. Moreover the KB model has shorter lags in the response of real net exports to relative prices than the HH model. This means that in the KB estimate the depreciation of the dollar since early 1985 would have had a greater positive impact on net exports, offsetting more of the negative the effect of the earlier appreciation.

B. GNP versus Domestic Expenditures

The choice between GNP and domestic expenditure in this exercise is important, not just for historical accounting purposes, but also in its implications for possible "cures" to the deficit. A prescription based on relative GNP growth targets could imply a significantly more painful adjustment process than one based on domestic expenditure targets. If GNPs are what move export and import volumes, the widening of the deficit to date apparently has not been due to any significant degree to a cyclical widening of the growth gap that could be readily reversed. GNPs at home and abroad were at or near cyclical peaks

in 1980, and average growth rates since then have been quite similar.[18] Also, to the extent that policy makers rely on changes in relative growth rates to reduce the deficit, U.S. GNP would have to fall significantly relative to foreign GNP, and U.S. domestic expenditures would have to decline relative to domestic expenditures abroad by an even greater amount (reflecting the resulting increase in net exports). However, if it is domestic expenditures that move trade volumes, growth factors have been quantitatively important in "causing" the widening of the deficit to date. Moreover, significant adjustment could be achieved by reversing the domestic expenditure gap that has emerged over the past seven years, and leaving relative GNP growth rates unchanged. Of course, changing the domestic expenditure gap implies structural adjustment at home and abroad as the U.S. economy shifts to the production of tradable goods and as foreign growth (which has until recently been export-led) is focussed inward.

In view of the implications of this issue for ongoing debates about cures to the deficit, we have reestimated the partial trade balance equations reported by HH using alternative activity variables, including GNPs, domestic expenditures, and a mix of the two. A priori, we would expect a mix of the two to outperform expenditures alone. As noted earlier, demand for intermediate goods, which account for nearly half of U.S trade, are more plausibly considered a direct function of output or GNP than of final domestic demand. With respect to imports and exports

---

18. Various indicators, including unemployment rates and crude measures of potential output, do suggest that U.S. GNP is presently as much as several percentage points closer to potential output than is foreign GNP. However, this gap is substantially smaller than the domestic expenditure gap discussed below.

of finished goods, which account for a little over half of U.S. trade, plausible theoretical cases can be made for either total incomes (GNPs) or expenditures as the appropriate determinants, although final expenditures would seem, to us, to be the more closely related variable.

The partial trade balance equations from the model reported by HH are listed in Table 6 in their implicit functional form. Both the nonagricultural export and the nonoil import volume equations include, in addition to the activity variables, relative prices, a relative capital stock variable (to capture shifts in the supply of traded goods that are not adequately captured in relative price data),[19] and a variable that quantifies the trade volume effects of dock strikes. In the import equation the activity variables are included with a one-quarter distributed lag (both the current and lagged coefficients are reported), and in both the import and export equations the relative price variables are included with eight-quarter distributed lags (for which only the sum of lagged coefficients is reported). (Table 6 also shows the import and export price equations used by HH, which we will be analyzing further at the end of this section.)

We estimated the volume equations over the period 1969Q1-1984Q4, in a double-log functional form. In-sample simulations were run over the period 1980Q1-1984Q4 and post-sample simulations were run over 1985Q1-1987Q2. The simulations were static (autoregressive residuals were

---

19. The supply developments in question, including, for example, the dramatic entry of Japan and subsequently a number of developing countries into world markets of various manufactured goods over the past two decades, tend to be spuriously correlated with income variables. Thus, the relative supply proxy has the effect of reducing the estimated income elasticity for U.S. imports and raising the estimated elasticity for U.S. exports. See Helkie and Hooper (1987) for a more detailed discussion of this issue.

Table 6

Partial Trade Balance Equations

Nonagricultural Export Price

$$P_{xna} = f(PD, (P^*/E)_{L4})$$

Nonagricultural Export Volume

$$X_{na}/P_{xna} = f(Y^*, (P_{xna}/E_m \cdot P_m^*)_{L9}, K^*/K, DS_{xna})$$

Nonoil Import Price

$$P_{mno} = f(P_b^*, (E_b)_{L8}, (PC)_{L4})$$

Nonoil Import Volume

$$M_{no}/P_{mno} = f(Y, (TR \cdot P_{mno}/P)_{L8}, K/K^*, CU^*/CU, DS_{mno})$$

Definitions

CU	-	U.S. manufacturing capacity utilization.
CU*	-	Deviation from potential output in foreign G-10 countries.
DS_{mno}	-	Dock strike variable specific to nonoil imports.
DS_{xna}	-	Dock strike variable specific to nonagricultural exports.
E_b	-	Exchange rate (foreign currency/dollar), 18 currencies, bilateral nonoil import weights.
E_m	-	Exchange rate (foreign currency/dollar), 18 currencies, multilateral trade weights.
K	-	U.S. private fixed capital stock.
K*	-	Private fixed capital stock in foreign OECD + 10 major developing countries.
M_{no}	-	Nonoil import volume.
P	-	U.S. GNP deflator.
P_b^*	-	Foreign CPI, 18 countries, bilateral nonoil import weights.
P_m^*	-	Foreign CPI, 18 countries, multilateral trade weights.
P_{mno}	-	Nonoil import deflator (GNP accounts).
P_{xna}	-	Nonagricultural export deflator (GNP accounts).
PD	-	Weighted average of U.S. producer prices, nonagricultural export weights.
TR	-	Index of tariff rates on nonoil imports.
X_{na}	-	Nonagricultural export value.
Y	-	U.S. real GNP (or real domestic expenditures).
Y*	-	Foreign real GNP (or real domestic expenditures), all countries, weighted by shares in U.S. nonagricultural exports.
$( )_{L9}$	-	Denotes, for example, a nine-quarter distributed lag on the term inside the parentheses.

excluded); the percentage root-mean-squared prediction errors are reported for all the simulations.

The results of our regressions are shown in Table 7. In both the export and import equations the domestic expenditure variables yield slightly higher coefficients than the GNP variables, while the coefficients on the mixed activity variables (which are 50/50 combinations of the other two) are intermediate. These differences are not statistically significant, however. The different activity variables influence other coefficients as well. Notably, both the level and the significance of coefficients on the relative price, capacity utilization and relative capital stock variables fall when the expenditure variable is used in the import equation. In terms of overall equation fit and recent in-sample behavior, the mix variable has at best only a slight edge over either of its two components. The differences in in-sample standard errors and corrected R-squares are small, however, reflecting the extent to which GNPs and domestic expenditures moved together over most of the sample period. In terms of post-sample prediction accuracy, the mix does slightly better than the others in the export equation, but clearly comes in second to GNP in the import equation.

In brief, the results in Table 7 provide little empirical basis for choosing among the alternative activity variables. In constructing our own estimates of the partial-equilibrium "causes" of the deficit below, we have chosen on a priori grounds (as described earlier) to use the mix specification.

C. Partial-Equilibrium Accounting

Table 7

Regression Results for U.S. Import and Export Volume Equations with Alternative Economic Activity Variables
(t-ratios in parentheses)

	Non-oil Imports			Non-agricultural Exports[1]		
	Real GNP	Real Domestic Expenditures	Mix[2]	Real GNP	Real Domestic Expenditures	Mix[2]
1. Constant	-2.21 (-0.48)	-7.28 (-1.21)	-5.55 (-1.09)	-2.57 (-0.52)	-13.80 (-1.99)	-12.59 (-1.84)
2. Activity Variable	1.11 (2.85)	1.24 (3.27)	1.19 (3.08)	1.91 (4.33)	2.09 (4.67)	2.03 (4.57)
3. Activity Variable (-1)[3]	0.96 (2.38)	1.07 (2.45)	1.06 (2.54)	—	—	—
4. Relative Prices (0-7)[4]	-1.13 (-10.34)	-0.84 (-5.73)	-0.98 (-8.20)	-0.95 (-6.39)	-0.80 (-5.23)	-0.88 (-5.90)
5. Relative Capacity Utilization	-0.30 (-1.41)	-0.03 (-0.13)	-0.13 (-0.56)	—	—	—
6. Relative Capital Stocks	-0.84 (-2.25)	-0.47 (-0.98)	-0.59 (-1.45)	0.76 (-1.25)	1.01 (-1.62)	0.93 (-1.50)
7. Dock Strike Dummy	0.80 (5.65)	0.83 (5.90)	0.81 (5.70)	0.75 (7.73)	0.75 (7.88)	0.75 (7.80)
8. Rho	0.46 (4.09)	0.50 (4.57)	0.46 (4.07)	0.72 (8.00)	0.73 (8.03)	0.72 (7.96)
9. Durbin Watson	1.91	1.92	1.91	2.07	2.09	2.08
10. R^2 (corrected)	0.9862	0.9858	0.9863	0.9874	0.9879	0.9877
11. Standard Error %	3.12	3.16	3.11	2.84	2.77	2.80
Model Prediction Errors[5]						
In-Sample						
12. RMSE (1980:1-1984:4) %	2.47	2.49	2.38	3.37	3.75	3.49
Post-sample						
13. RMSE (1985:1-1987:2) %	2.66	4.61	3.70	5.79	5.72	5.60

Sample Period: 1969:1 to 1984:4

1. Foreign GNP and Domestic Expenditures measures cover all foreign countries (see text).
2. Mix is calculated by equally weighting GNP and Domestic expenditures.
3. Denotes one-quarter lag.
4. Denotes 8-quarter distributed lag for both imports and exports; sum of lagged coefficients is reported.
5. Based on in-sample and post-sample simulations excluding autoregressive residual. Root mean squared prediction errors are reported.

Table 8 presents our estimates of the contributions of each of a number of partial equilibrium factors to the widening of the partial real trade deficit (nonagricultural-nonoil), the total real trade deficit, and the deficit on real net exports of goods and services, between the fourth quarter of 1980 and the fourth quarter of 1986. These estimates were calculated as in HH, using essentially the same model, but with the nonagricultural export and nonoil import volume equations using the "mix" version of the activity variables substituted for those using GNP variables.[20] The difference between columns 1 and 2 reflects the impact of contributing factors on oil imports and agricultural exports. The decline in oil imports in lagged response to the 1979-80 oil price hike made a significant positive contribution to the real trade balance. The difference between columns 2 and 3 reflects impacts on the various components of the service account. For example, changes in GNP influence both direct investment income (through its impact on resource utilization and profits) and demand for other services (travel, transportation, and so on). And, changes in relative prices (or exchange rates) influence both the demand for other services and the valuation of net direct investment income receipts. The decline in real net portfolio investment income is due largely to the increase in U.S. net portfolio indebtedness. In principle, this decline could be allocated among the other causal factors that contributed to the increasing indebtedness (by reducing net exports), but we have not done so in the table.

---

20. These calculations were made in some cases by simulating the model with the contributing factors listed in Table 7 (U.S. and foreign GNP and domestic expenditures, relative prices, and relative capital stocks) each alternately held unchanged at their 1980:4 values, through 1986:4. In other cases, the estimates were made judgmentally as described below.

Table 8

Partial-Equilibrium "Causes" of the Real External Deficit
(billions of 1982 dollars, annual rates)

Contributing Factor	Contributions to Changes in Real Net Exports and Its Major Components 1980:4-1986:4 1/		
	Partial Real Trade Balance	Total Real Trade Balance	Net Exports of Goods and Services
Changes in U.S. and Foreign GNP and Domestic Demand 2/	-48	-69	-77
Changes in Relative Prices of Exports and Nonoil Imports	-98	-105	-113
Changes in Relative Capital Stocks	-20	-20	-20
Lagged Responses to Oil Price Shock (conservation and increased production)	--	+26	+26
Decline in Net Investment Income	--	--	-25
Other Factors	0	-4	+5
Total	-166	-172	-204

1/ Calculated as contribution due to total change in the contributing factor over the period 1980:4 - 1986:4, except for relative prices, which are lagged.
2/ Based on 50/50 mix of GNP and domestic expenditures for both U.S. and foreign variables.

The estimates in Table 8 are broadly similar to those in the previous studies. First, they suggest that the widening of the deficit between 1980 and 1986 can be fully accounted for by partial-equilibrium macroeconomic factors. (In fact, the residual item near the bottom of the table suggests that the other factors shown more than account for the deficit.) Second, changes in relative prices and the associated depreciation of the dollar are still the dominant contributing factors. However, the growth factor also has a substantial impact, contributing nearly $80 billion, or roughly 40 percent of the total decline in net exports of goods and services over the period in question. These results suggest that a reversal of the U.S.-foreign GNP and domestic demand gaps that emerged during the first half of the 1980s would contribute substantially to a resolution of the U.S. trade deficit. Nevertheless, if a resolution were to be achieved without a significant drop in U.S. GNP relative to foreign GNP, it would most likely involve a reversal of the relative price shock that took place over the first half of the decade. In view of the substantial reversal of the dollar's earlier appreciation that <u>has</u> taken place already over the past two and a half years, we now ask why the external deficit has persisted to mid-1987.

D. <u>The Persistence of the Deficit: Macro Explanations</u>

Most measures of the dollar's real exchange rate indicate that as much as three-fourths of the appreciation over the first half of the decade has been reversed since early 1985. (This subject is considered in more detail in the next section.) Yet the nominal deficit apparently has continued to widen through the third quarter this year, and absent some sharp fluctuations in oil imports, real net exports have begun to show

only moderate signs of a turnaround. HH and KB have attributed the persistence of the deficit to the pattern of exchange rate changes (notably the fact that the dollar was appreciating strongly before it started to fall) and normal lags (including J-curve effects) in the adjustment of the deficit to these swings in the dollar. They also note that significant adjustment has taken place in that the deficit is smaller than it would have been if the dollar had not depreciated.

Does this explanation still hold up? Our answer is partly yes, partly no. There are now clear signs that the adjustment process is taking longer than would be predicted on the basis of historical experience, particularly for certain components of the external deficit.

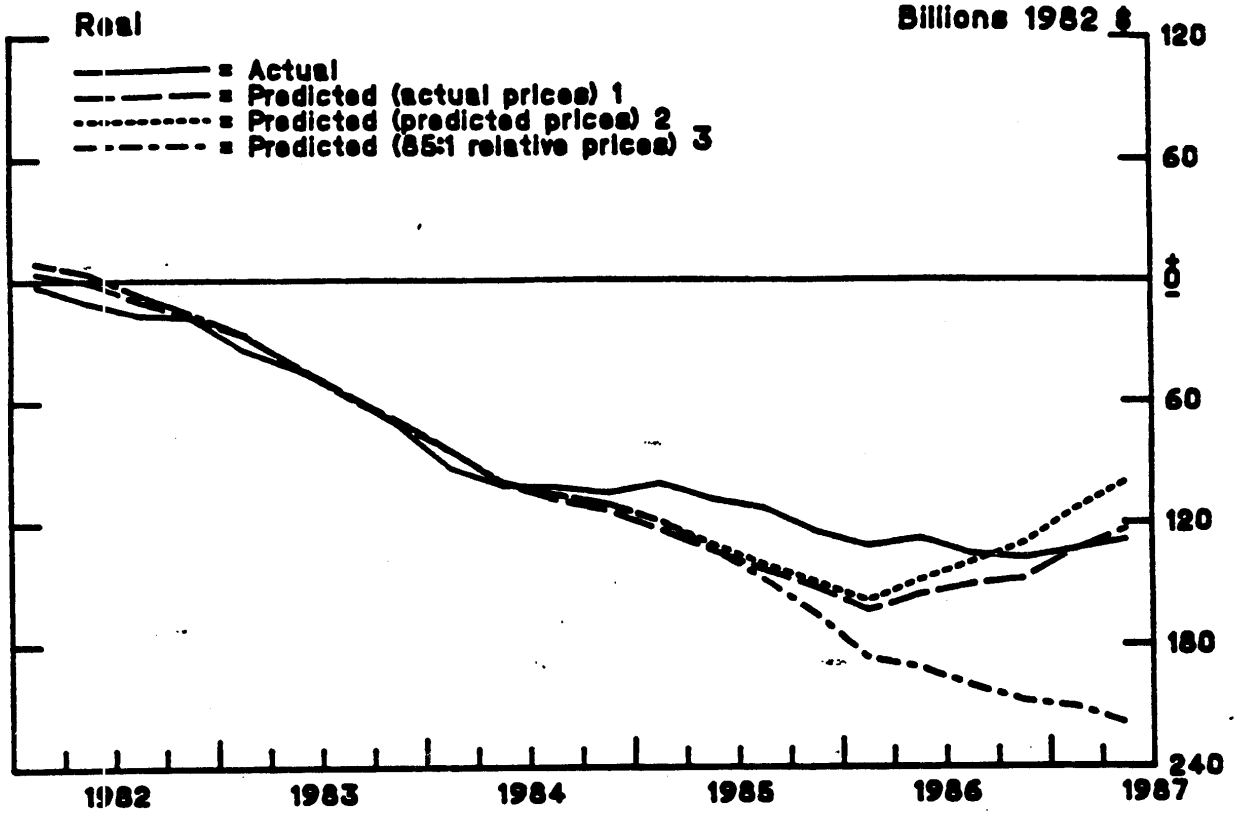
1. Persistence of the Partial Trade Deficit

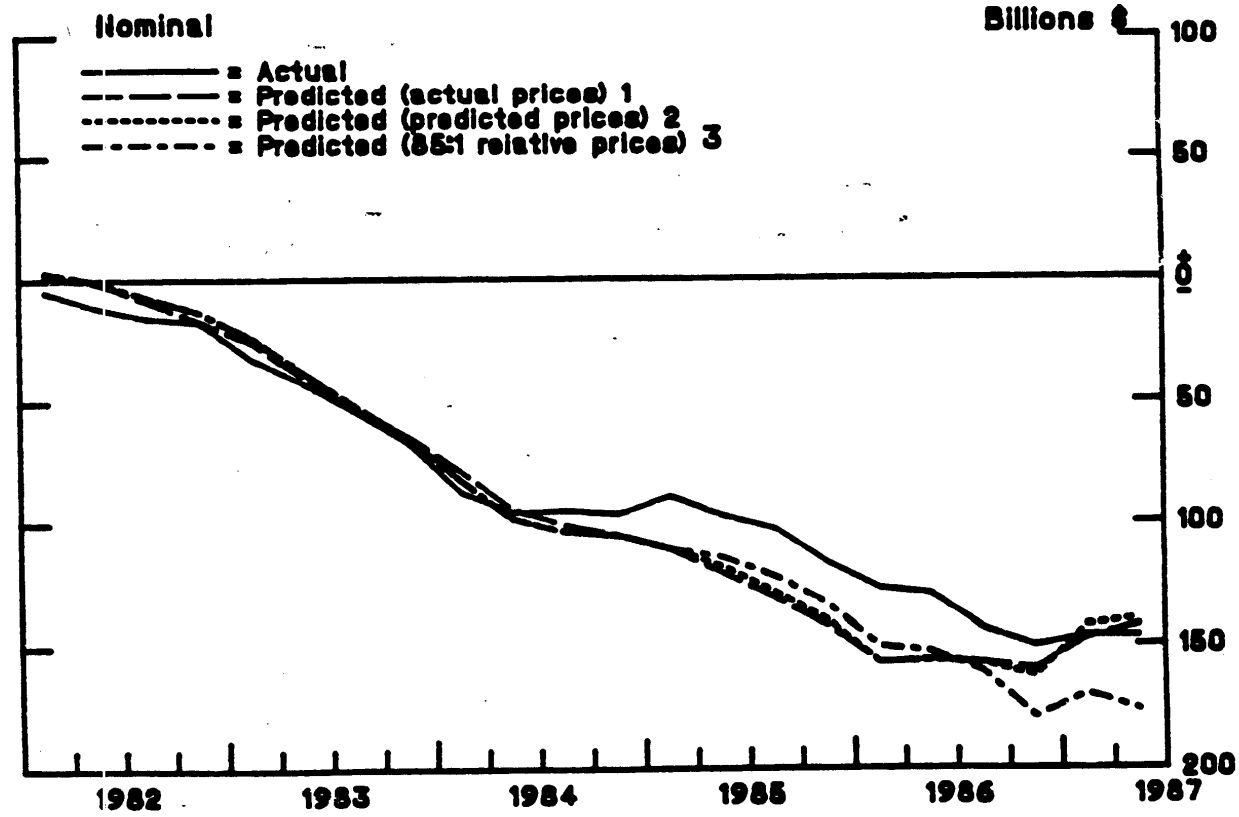
Chart 5 shows predictions of the real and nominal partial trade balance (nonagricultural export - nonoil import) equations discussed earlier, using our "mix" specification for activity variables. Two predictions were made, one using actual values of nonoil import and nonagricultural export prices, and a second using the model's predictions of those prices. A third simulation is also included, showing the model's prediction of where the deficit would be if the relative prices of nonoil imports and nonagricultural exports had remained at their values in the first quarter of 1985 when the dollar was at its peak.

The chart suggests that the decline in the dollar has clearly had a substantial impact to date, particularly on the real trade balance (as indicated in the top panel). The model's prediction of the real partial trade balance in 1987:2 was slightly more than half as large as it would have been if the dollar had not declined and relative prices had

Chart 5

Partial Trade Balance





1. Model prediction using actual values of relative prices.
2. Model prediction using model's prediction of import and export prices.
3. Model prediction holding relative prices unchanged at their 85Q1 values.

remained at their 1985:1 values.[21] At the same time, the predicted real balance fell below the actual balance in 1985, but has been rising noticeably faster since early 1986 (particularly when predicted import and export prices are used). Thus, while the real deficit has responded significantly to the fall in the dollar, it has done so more slowly than past experience would have predicted, particularly in recent quarters.

The bottom panel of the chart shows that the model's prediction of the nominal trade balance was only slightly above the actual balance in the second quarter of 1987. Although the predicted nominal balance had been rising for several quarters, it had fallen below the actual earlier. The fall in the dollar has had a much smaller positive impact on the model's prediction of the nominal trade balance than its prediction of the real balance because of "J-curve" effects. The steady depreciation of the dollar has led to a predicted steady increase in import prices (in fact, an overprediction, as discussed below), which has offset much of the predicted gain in real net exports. In any event, the results in Chart 5 suggest that the persistence of the deficit, in real terms at least, cannot be fully explained by partial-equilibrium macroeconomic factors.

The prediction errors of the major components of the partial trade balance are shown in Table 9. The most striking errors are for

---

21. The decline in the dollar has had a much smaller impact on the model's prediction of the nominal trade balance to date because of J-curve effects. The gradual depreciation of the dollar causes a gradual increase in import prices, which initially offsets much of the gain in real net exports. Note that these simulations were run with income and other "exogenous" determinants of the partial trade balance held unchanged. Factors that might have induced the alternative relative price paths could also have influenced the trade balance through its other determinants.

Table 9

Partial Trade Balance Equations:
Post Sample Prediction Errors 1/

	1985				1986				1987	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
					(Percent)					
Volume Equations (Using Actual Prices										
Nonag. Export Volume	-6.96	-6.78	-6.92	-6.32	-6.61	-5.14	-4.59	-2.30	3.55	5.89
Nonoil Import Volume	3.19	3.98	5.38	4.63	5.50	4.76	1.31	1.32	2.32	2.25
Price Equations										
Nonag. Export Price	-0.33	-0.09	0.29	1.18	2.08	2.19	3.91	5.48	6.17	6.94
Nonoil Import Price	1.17	0.05	0.17	0.77	2.42	3.35	5.34	9.02	8.23	10.81
Volume Equations (Using Predicted Prices)										
Nonag Export Volume	-6.51	-6.29	-6.40	-5.85	-6.31	-5.17	-4.98	-3.16	2.03	3.58
Nonoil Import Volume	2.07	3.21	4.86	4.07	4.27	2.74	-1.94	-3.95	-4.24	-5.79

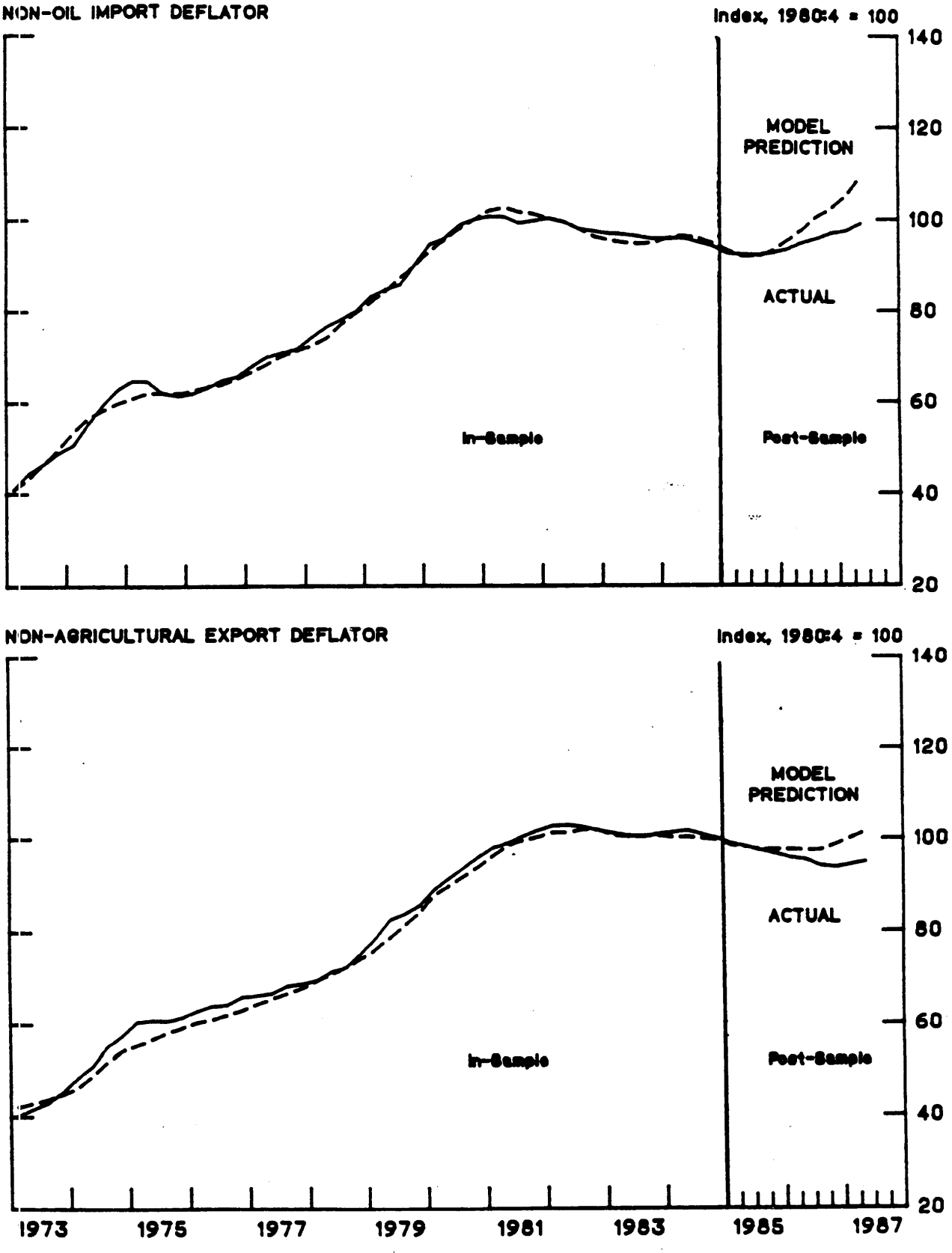
1/ Error = predicted minus actual.

nonoil import prices, and to a lesser extent nonagricultural export prices, both of which were being overpredicted by the model. (These prediction errors are also illustrated in Chart 6 as the difference between the predicted and actual values of the nonoil import and nonagricultural export deflators shown.) The model also began to overpredict the volume of nonagricultural exports in the first half of 1987 (especially when the actual value of nonagricultural export prices was used in the volume equation), and to underpredict nonoil import volumes when predicted values of nonoil import prices were used.

The overprediction of nonagricultural export volumes and nonoil import prices suggests that foreign competitors were reducing their export prices in terms of their own currencies (hence their profit margins) more than they would have in the past in response to the appreciation of their currencies against the dollar. The model's overprediction of U.S. nonagricultural export prices is also symptomatic of more intense price competition from abroad than had been observed in the past, on average, under similar circumstances. Moreover, the model's underprediction of real net exports during 1984 and 1985 suggests the possibility that competition abroad was less intense than expected during the latter stages of the rise in the dollar. Profit margins of foreign competitors may well have been built up more during this earlier period, providing a cushion that could be squeezed later. This cause of "persistence" in the U.S. external deficit, particularly in real terms, will be the focus of much of our discussion of microeconomic factors underlying the deficit in Section VII. In the remainder of this section we review evidence on the behavior of profit margins that can be gleaned from macro data.

Chart 6

Trade Prices



2. Aggregate Data on Prices and Profit Margins.

Chart 7 shows the two most important components of the import price equation discussed earlier: the non-oil import deflator and a weighted average of foreign consumer prices in dollars (as a proxy for foreign production costs). It is clear that after having moved quite closely together during 1973-84, the two series began to diverge in 1985, as the import deflator fell substantially relative to this particular proxy for foreign costs in dollars .[22] These data appear to support the hypothesis that foreign profit margins have been squeezed significantly over the past two years as foreign firms have strived to maintain their shares of the U.S. market in the face of a falling dollar. At the same time, however, there is little evidence based on these aggregate data to suggest that profit margins on goods exported to the United States widened significantly while the dollar was rising. This chart suggests that even if foreign producers had delayed the pass-through of exchange rate changes thus far, they cannot continue to do so, and further adjustment of import prices must be in the pipeline.

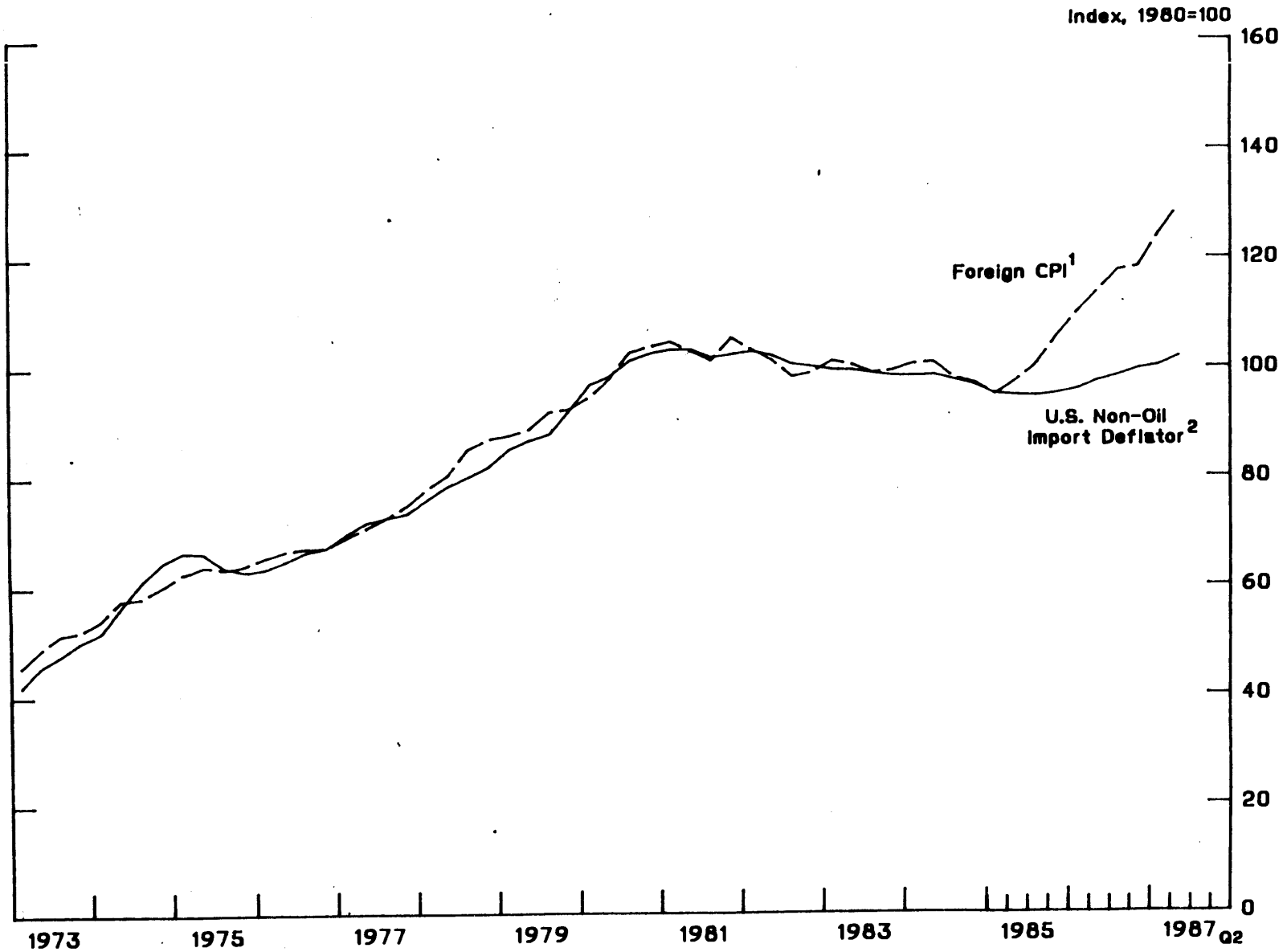
There are several other possible explanations for the emerging gaps between import prices and foreign prices shown in these charts, which have different implications for the movement in import prices. To begin with, consumer prices are not ideal proxies for foreign production costs. Some evidence on this point is presented in Chart 8, which shows

---

22. Other measures of foreign costs, including foreign wholesale prices in dollars show qualitatively similar pictures. We prefer to use consumer prices because the coverage of available aggregate wholesale price indexes is much more variable across countries. In some cases they reflect a fairly narrow set of tradable commodities, and do not adequately represent movements in domestic labor costs. Of course, CPIs have their problems too as proxies for costs, as we note below.

Chart 7

U.S. Import Prices and Foreign Prices



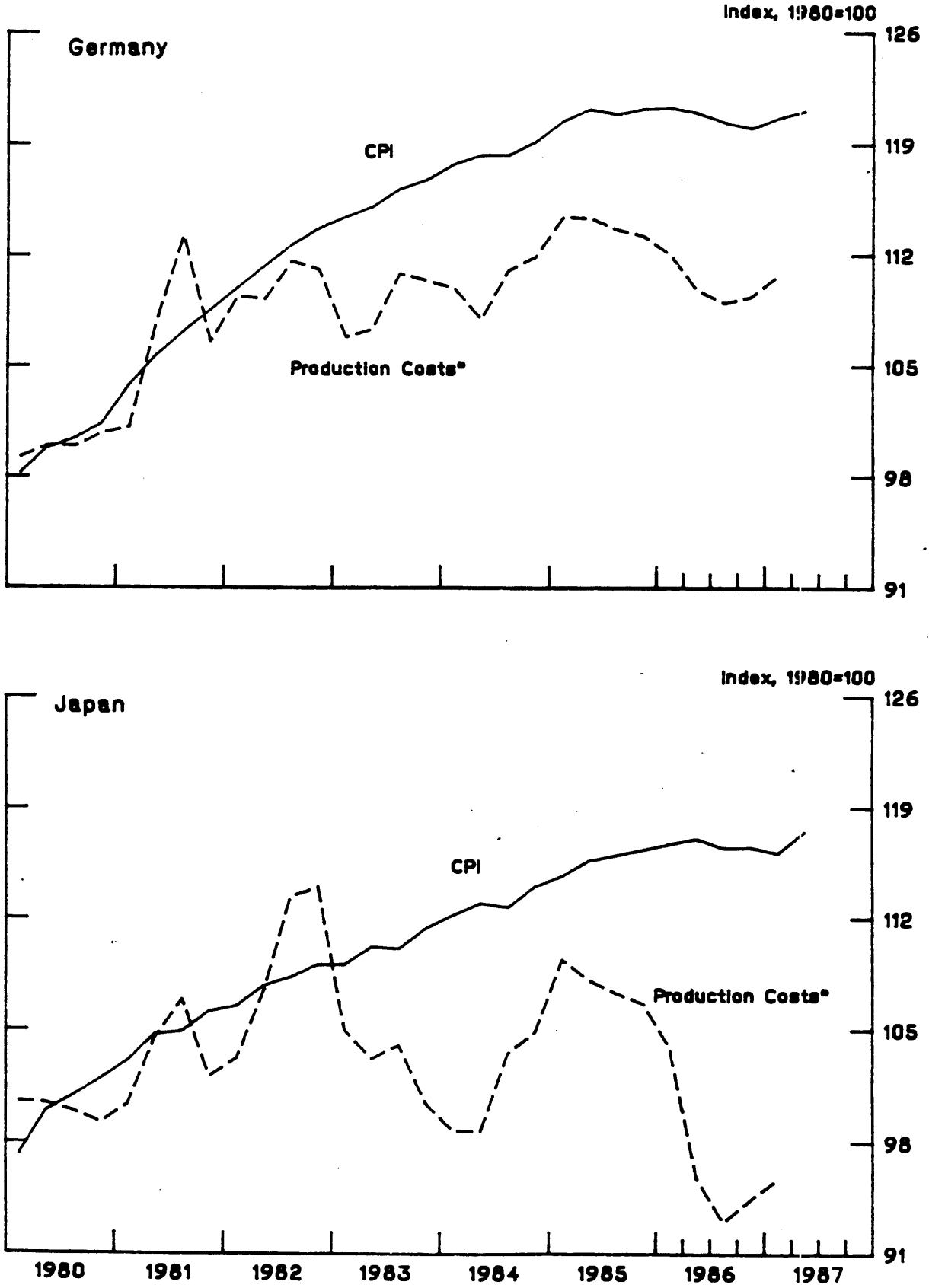
Source: Federal Reserve Board USIT model database.

1. CPI's in dollars for 10 industrial countries and 8 developing countries weighted by shares in U.S. non-oil imports during 1978-83.
2. Implicit deflator from the GNP accounts.

Chart 8

Consumer Prices and Manufacturing Production Costs

(In local currencies)



Source : CPI : National sources, ULC and raw materials prices see chart 9.

* Weighted average of manufacturing unit labor costs (65%) and raw materials (including petroleum) prices (35%).

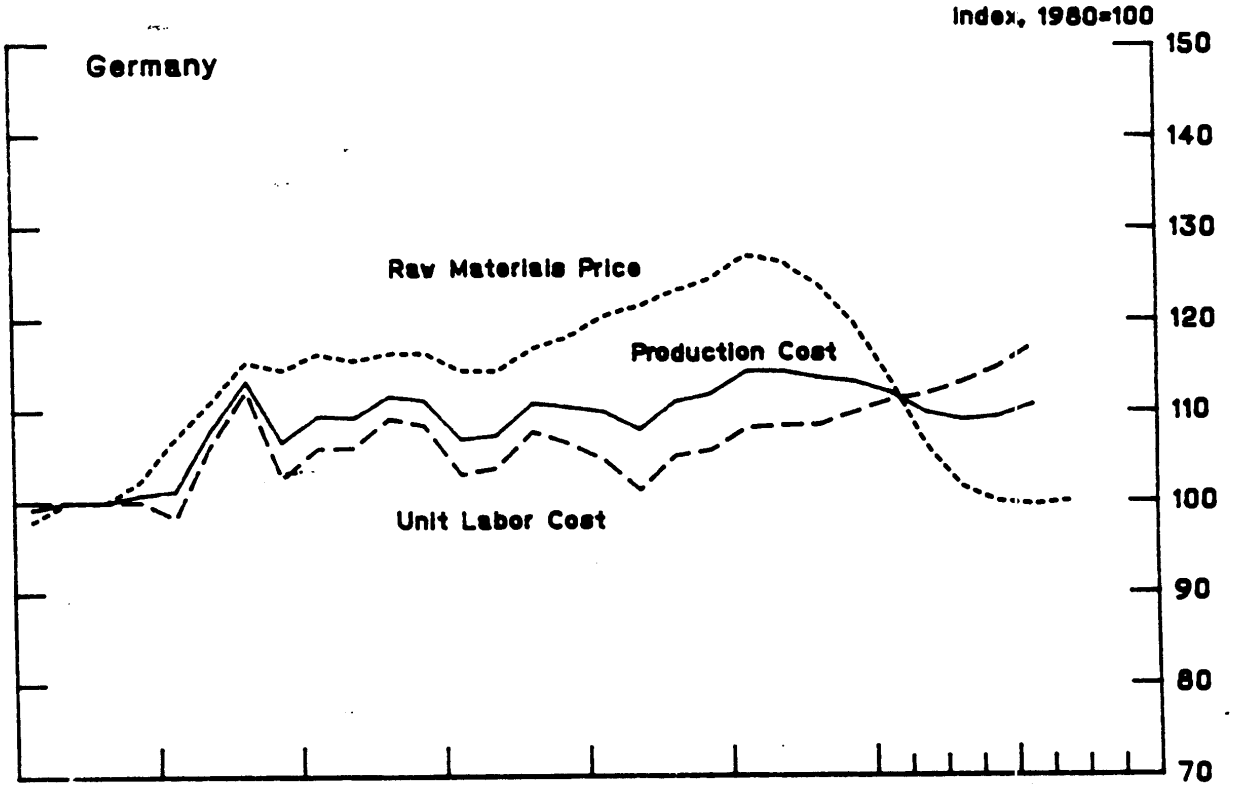
CPIs compared with local production costs for Germany and Japan. The measure of production costs shown is a weighted average of unit labor costs in manufacturing and the local wholesale price index for raw materials and fuels. The components of the cost index are shown in Chart 9, along with the combined index. (The weights used in constructing the combined index were based on the relative shares of labor compensation and raw material plus fuel inputs in manufacturing in the 1977 U.S. input-output table.) It is clear from Chart 8 that after having fluctuated more or less in line with the CPIs historically, the cost indexes have declined noticeably relative to the CPIs since 1984, particularly in Japan. As indicated in Chart 10, this decline reflects a sharp decline in the local currency prices of raw materials and fuels in those countries.

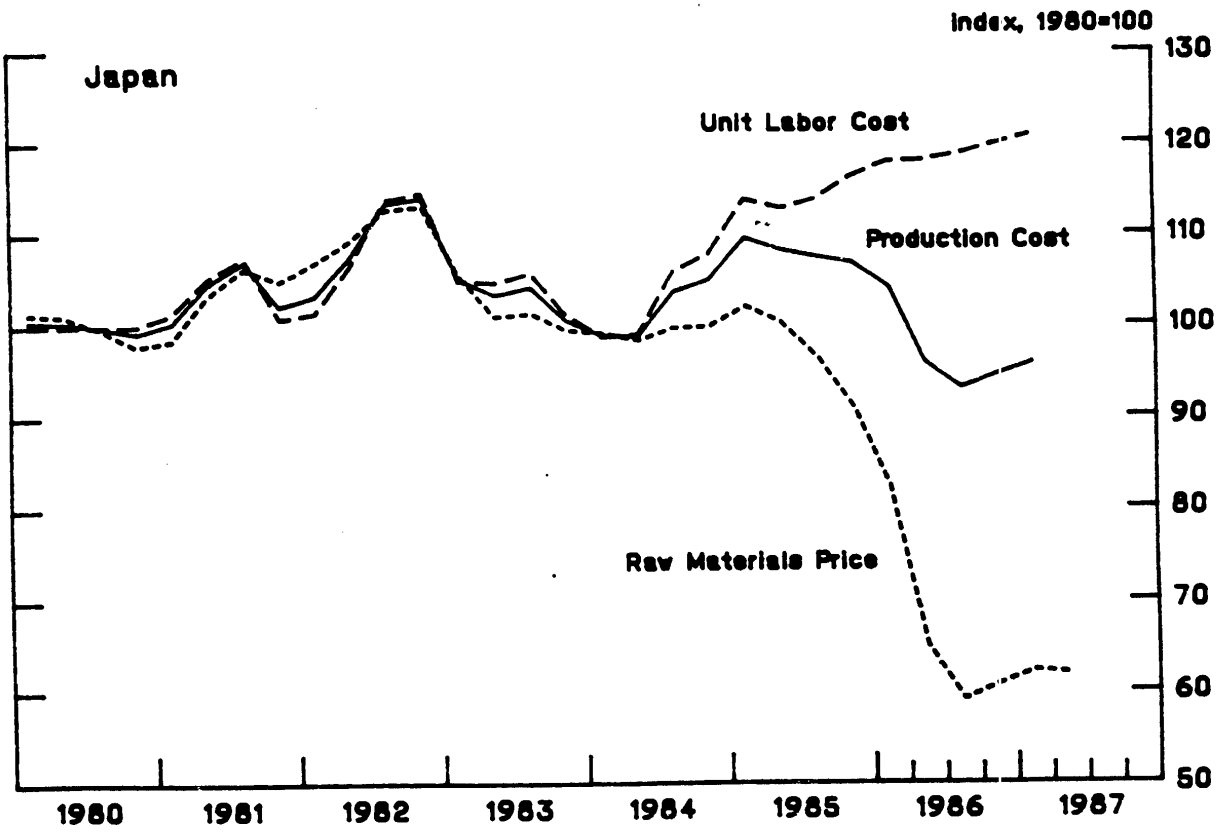
To the extent that CPIs overstate the rise in foreign production costs they understate the increase in profit margins earned while the dollar was rising and overstate the decline in foreign profit margins that has occurred with the decline in the dollar. To gauge the possible significance of this bias, we compare production costs and CPIs with German and Japanese export prices for manufactured goods in Chart 10. Also shown for Japan is the BLS price index for that country's manufactured exports to the United States. In the Japanese case, the gap that has emerged between export prices and production costs is substantially smaller than that between export prices and the CPI. By 1987:1, the apparent squeeze in profit margins on Japan's exports to the United States based on the index of production costs was about half as large as that based on the CPI as a proxy for costs. (It is also noteworthy that Japanese exporters appear to have squeezed their profits

Chart 9

Manufacturing Cost Indexes and Their Components

(In local currencies)

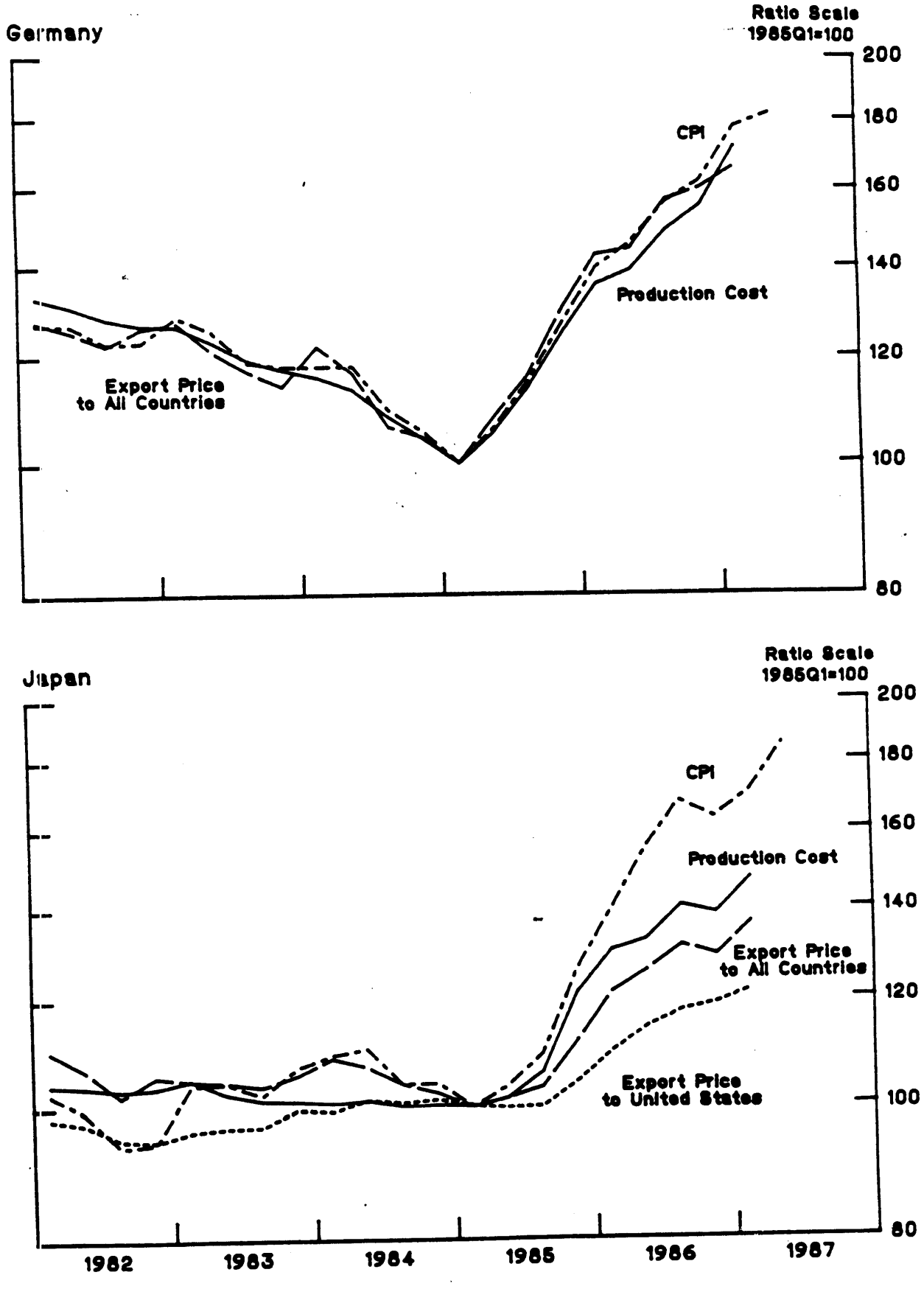




Source : ULC : OECD ; Raw materials price : National sources.

Chart 10

Foreign Export Prices and Production Costs
(All Indexes in US dollars)



Source : CPI : National sources ; Export prices : BLS.

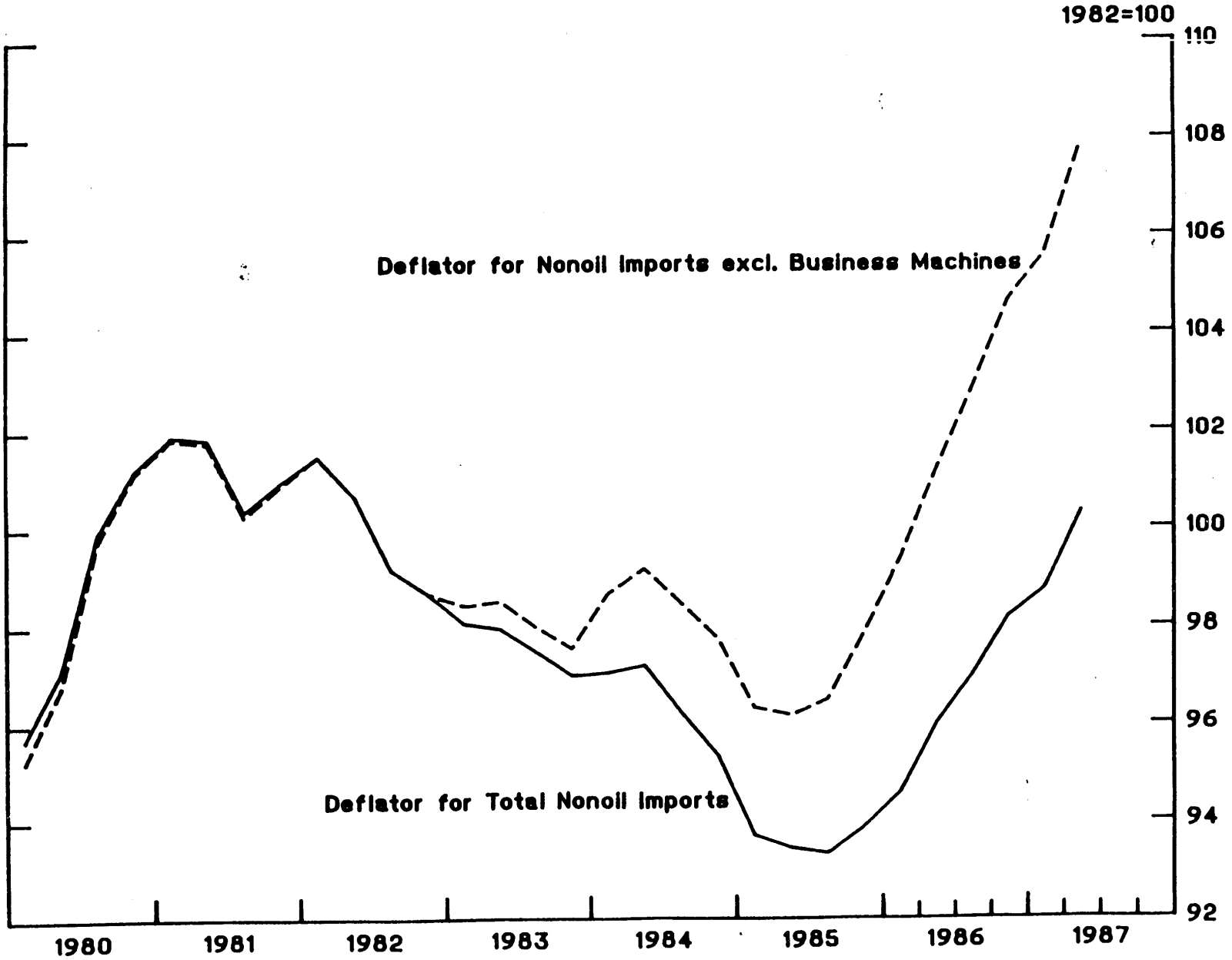
on exports to the United States more than they have on exports to other countries -- a point we will return to later.) In the German case, the production cost measure appears to eliminate any decline in profit margins on total exports over the past two years. This still leaves open the possibility of a squeezing of profits on exports to the United States, however.

Another possible explanation for the emerging gap between import prices and foreign prices concerns a key component of the import deflator. The prices of business machinery, which account for over 10 percent of imports in 1982 dollars, have been estimated by the Department of Commerce (Bureau of Economic Analysis) to have declined at roughly a 15 percent annual rate over the past four years. The effect of this component on the overall deflator is shown in Chart 11, which plots the nonoil deflator and the deflator for nonoil imports excluding business machines. The decline in business machine prices almost has the effect of creating a break in the series for the total deflator beginning in about 1983.[23] It is unlikely that foreign CPIs or even aggregate production costs adequately reflect the importance to the U.S. import deflator of the decline in the cost of producing business machinery. Therefore, some of the apparent decline in aggregate profit margins

---

23. One could also raise more fundamental questions about the use of deflators to measure prices and profit margins, given their sensitivity to shifts in the composition of imports. However, as suggested by Charts 7 and 8, the problem that has arisen is a fairly recent one. We find that the deflator does about as well as a fixed-weight import price index in aggregate import price equations over the historical sample period through 1984. Moreover, the fixed-weight index is also affected noticeably by the decline in business machinery prices (though not as much as the deflator).

Chart 11
Nonoil Import Deflators



Source: FRB macro database.

probably reflects instead the unusual behavior of business machinery prices.[24]

In sum, the evidence based on aggregate data appears to suggest that foreign profit margins on exports to the United States have been squeezed somewhat more than might have been expected over the past two years. However, various measurement problems with available aggregate data render this evidence somewhat less than conclusive. It seems likely, for example, that foreign production costs have risen somewhat less than foreign consumer prices, on average. Nevertheless, using more refined estimates of production costs for Japan, we do find evidence of a significant squeezing of profit margins on Japanese exports to the United States since 1985. We will return to the subject of foreign pricing behavior and an analysis of the behavior of U.S. import prices at the industry level with our discussion of microeconomic factors in Section VII. First, however, we turn to macroeconomic causes of the deficit at a more fundamental level.

VI. Macroeconomic Factors: Policy Shifts and Other Fundamentals

In the preceding section we established that partial-equilibrium macroeconomic factors, including relative prices (or real exchange rates) and relative growth rates, can account for the widening of the external deficit between 1980 and 1986, though not for all of its more recent

---

24. This does not pertain to the apparent squeezing of Japanese profit margins illustrated in the bottom panel of Chart 12, since the BLS export price data shown there does not incorporate a strong negative trend in business machinery prices.

persistence. We now consider the extent to which the contributions of these proximate determinants can be explained by shifts in fiscal and monetary policies at home and abroad during the 1980s. We begin with an analysis of factors underlying movements in the dollar's exchange rate, and then turn to a quantitative analysis of the effects of shifts in fiscal and monetary policy, drawing on the results of policy simulations with a number of international macroeconomic models.

A. Factors Underlying Movements in the Dollar

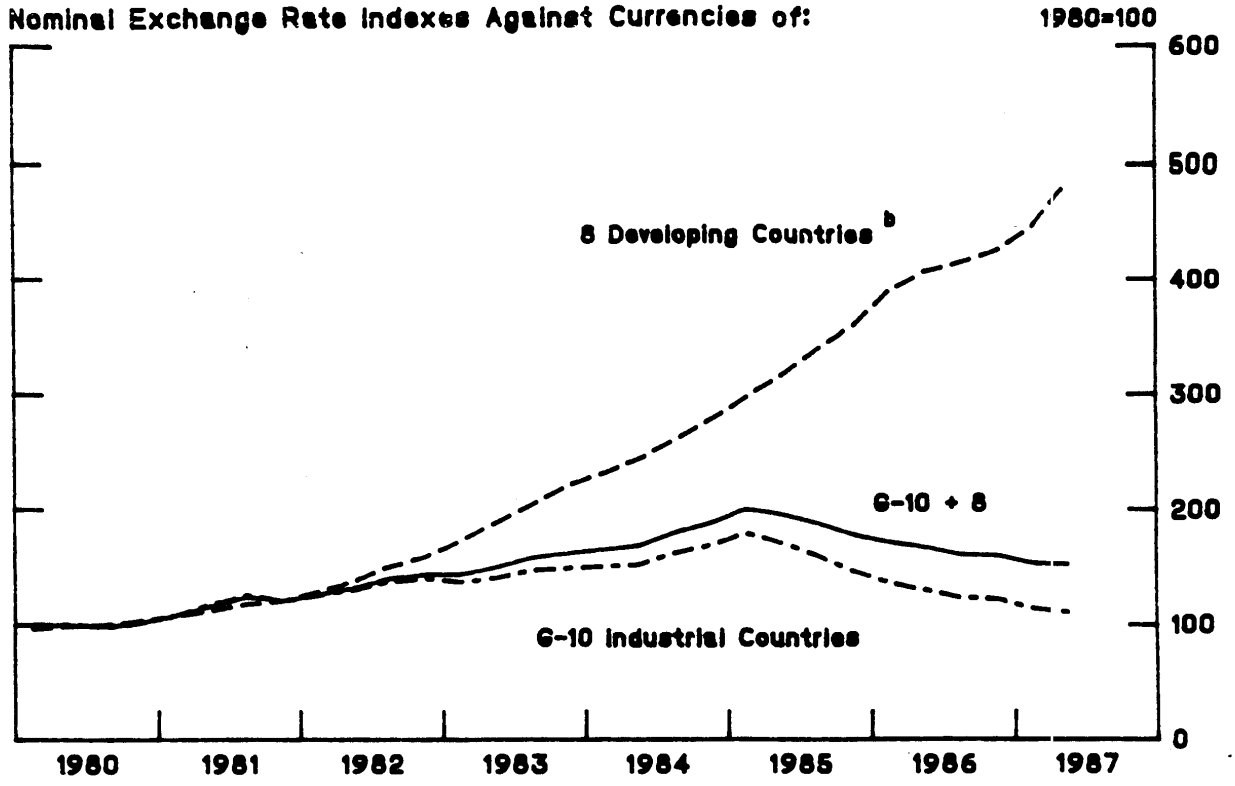
Movements in the dollar's average real (CPI-adjusted) foreign exchange value against the currencies of several different groups of countries are shown in Chart 12. The indexes shown include ten industrial countries, eight developing countries and the eighteen countries combined. The currencies are weighted by each country's share in world trade. The G-10 and 8-Developing country indexes show divergent movements. While the dollar has fallen sharply against the G-10 currencies over the past two years, developing countries, on average, have kept their currencies from appreciating in real terms against the dollar over this period. This divergence of rates has important implications for certain categories of U.S. imports, as we will discuss in the next section. Overall, however, the 18-country index is dominated by movements in the G-10 index,[25] and in the rest of this section we will focus on factors that have led to swings in the dollar's exchange rate against the currencies of industrial currencies.

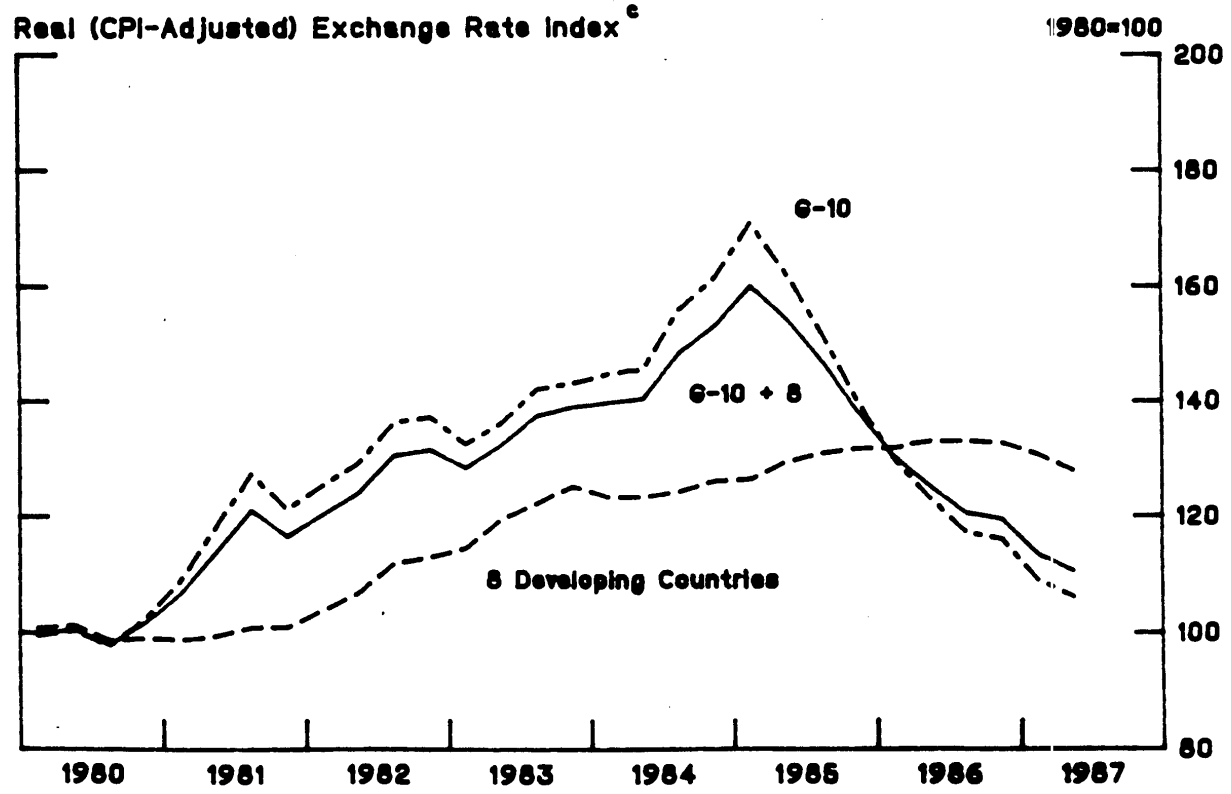
---

25. This is also true of indexes weighted by bilateral import shares. See Helkie and Hooper (1987) and Pauls (1987).

Chart 12

Foreign Exchange Value of the Dollar [a]





Source: Federal Reserve Bulletin.

a. Foreign currency/dollar indexes weighted by each country's share in world trade during 1978-83.
b. Includes Brazil, Hong Kong, Malaysia, Mexico, Philippines, Singapore, South Korea, and Taiwan.
c. CPI adjusted index is equal to nominal index times the ratio of US CPI to weighted average foreign CPI (using same countries and weights as in nominal index).

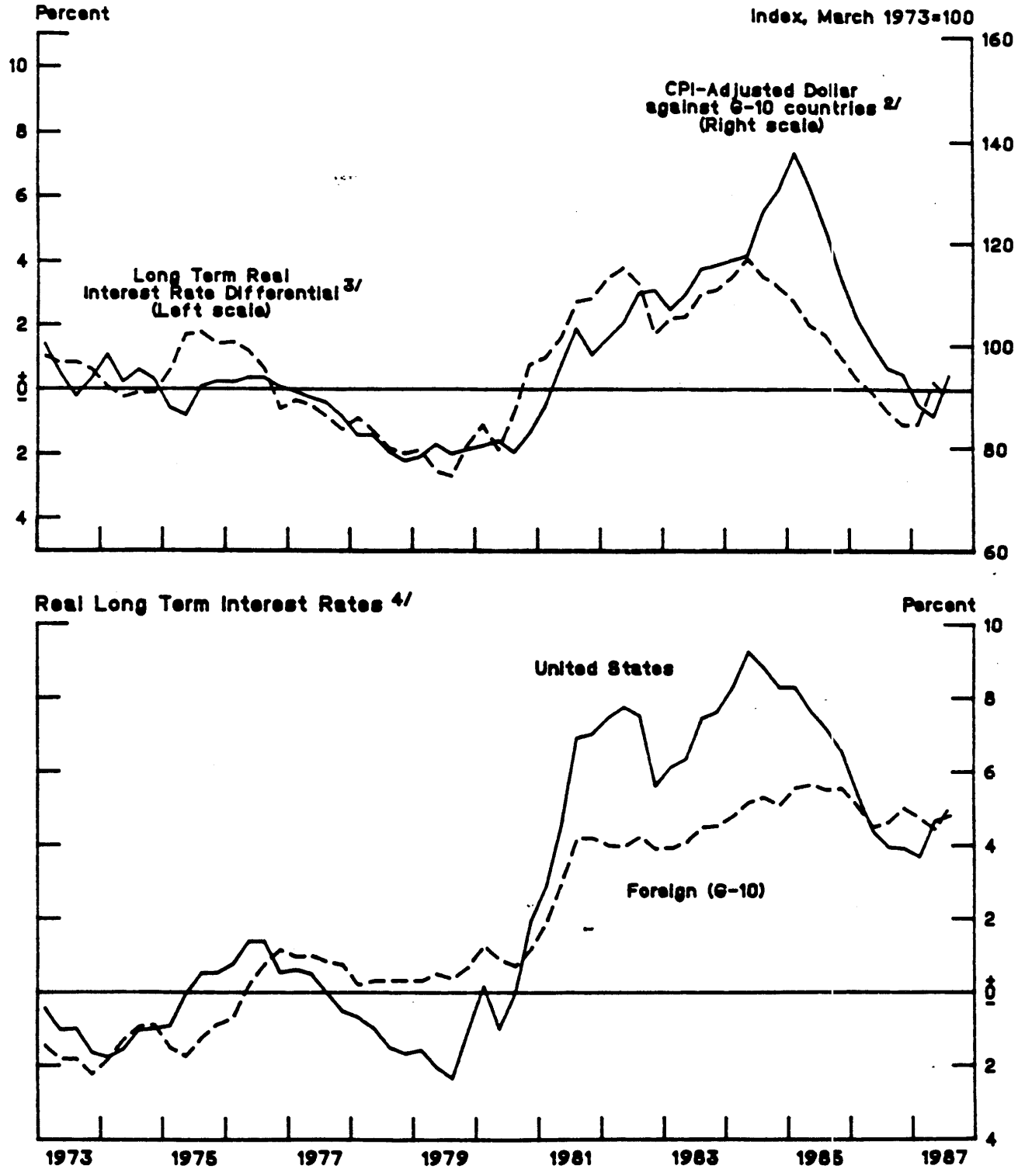
Our analysis of movements in the dollar's real exchange rate draws on the model of exchange rate determination that was discussed at the end of Section III -- the long-term real open interest parity relationship. The essence of this model is that the dollar will move to equate the expected rate of return on assets denominated in different currencies. An empirical representation of this relationship is given in Chart 13.

The top panel of Chart 13 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.)

It is clear from the chart that movements in the dollar's real exchange rate have been at least roughly correlated with the long-term real interest rate differential over much of the floating-rate period. Movements in the dollar over the 1980s can be broken into three stages. The first stage, which lasted through 1983, was a rapid appreciation (with several interruptions) that followed a sharp (6 percentage point) increase in the real U.S. bond rate relative to the average foreign rate. The second stage, beginning in early 1984, was a further rapid appreciation that took place despite a sharp decline in the U.S. real interest rate relative to foreign rates. The third stage was the rapid

Chart 13

The Dollar and Real Interest Rates
(Quarterly data) 1/



Source : Federal Reserve Board macro data base.

1/ The last observation is an average for July-August 1987.
2/ 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.
3/ Long-term real U.S. interest rate minus weighted average of long-term real foreign-country interest rates.
4/ 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 2.

depreciation beginning in March 1985 that coincided with a continued decline in the interest differential through early 1987.

Given the assumptions underlying the long-run open interest parity model (close substitutability of assets, absence of exchange risk aversion, and a constant expected long-run equilibrium real exchange rate), a 1 percentage point increase in real dollar interest rates relative to foreign rates on bonds maturing in x years will induce an immediate x percent appreciation of the dollar. In this case, the dollar can be expected to depreciate by 1 percent per year for x years, returning to its long-run equilibrium level. The scaling of the top panel of Chart 13 is consistent with about a six-year expectations horizon. That is, a 1 percentage point increase in the interest differential (left scale) induces roughly a six percent appreciation of the dollar (right scale). In principle, the horizon could be significantly longer, given that the interest rates used in the chart pertain to bonds with terms to maturity ranging between five and ten years. (The terms to maturity vary across countries, depending on data availabilities.) On purely empirical grounds, however, the six-year horizon appears to fit best.[26]

This relationship suggests that the roughly 35 percent appreciation of the dollar during stage 1 (1980-82) can be fully explained by the 6-percentage point increase in the interest differential over that period. During stage 3 (1985-86), however, the dollar fell

---

26. This empirical result is confirmed in regression analysis reported in Hooper (1985), and can probably be explained by the flatness of yield curves at terms of more than five years.

considerably more than this relationship would suggest. (We will return to this point, as well as a discussion of stage 2, below.)

The bottom panel of the chart illustrates clearly that the stage 1 increase in the real interest differential reflected a very large (nearly 10 percentage point) increase in U.S. real rates that was only partly offset by an increase in average foreign rates. The more recent decline (through early 1987) has been largely the result of a decline in U.S. rates, while foreign rates have been much more stable. The "consensus" explanation for the rise in U.S. real interest rates in the early 1980s that appears to have emerged in the literature includes 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.[27] The more recent decline in U.S. real rates has been linked to both the adoption of a more accommodative monetary policy stance by the Federal Reserve after 1982, and improved prospects for a significant reduction of the federal budget deficit following the passage of the Gramm-Rudman legislation in 1985.[28] We will return to a discussion of the quantitative effects of shifts in U.S. (and foreign) fiscal and monetary policy on the dollar (and the external deficit) at the end of this section.

---

27. See Blanchard and Summers (1984) for an analysis of factors underlying the rise in real interest rates in the early 1980s. Branson, Fraga and Johnson (1985), Feldstein (1986) and Hooper (1985) all provide empirical analyses linking the rise in the dollar to the 1981 tax cut through its impact on real interest rates.
28. See Johnson (1986).

The long-term real interest parity relationship, and more fundamentally, the shifts in policies underlying the changes in real interest rates, still leave a significant portion of the dollar's movement during the 1980s unexplained. Deviations between the dollar and the interest differential in Chart 13 can be traced to the failure of one or more of the assumptions underlying the interest parity model. Consider, for example, the assumption of a constant expected equilibrium real exchange rate. The long-run equilibrium real rate is often defined as the rate that is consistent with a sustainable level of the current account in the long run.[29] Views about what level of the current account (and therefore the dollar) is politically sustainable appear to have changed over time. By mid-1985 the unprecedented level of the U.S. current account deficit and prospects for even larger deficits had become a matter of central concern to economic policymakers. Mounting protectionist pressures in the United States, and official pronouncements (such as the September 1985 "Plaza Accord") that the dollar would have to be brought down, may well have induced a significant shift in market expectations about the equilibrium real exchange rate. Such a shift would have caused the dollar to fall faster than the rate predicted by movements in the real interest differential, as it did in stage 3 (early 1985-early 1987).

Movements in the dollar and the interest differential could also differ significantly if the assumption that financial assets denominated in the different currencies are close substitutes does not hold. In this case the risk premium on dollar assets would rise (and the dollar would

---

29. See, for example, Krugman (1987).

fall, with unchanged interest rates) as the U.S. current account deficit required foreign residents to hold increasing amounts of dollar-denominated claims. This effect could help to explain the rapid fall in the dollar since 1985, but it should also have been holding the dollar below the interest differential when U.S. net external debt was beginning to rise substantially during 1983-85. In any event, a number of empirical studies have suggested that this effect has not been empirically significant in the past, and that the assumption of close substitutability does hold to a reasonable approximation.[30]

Finally, stage 2 (early 1984-early 1985) remains a puzzle. The dollar rose more than 20 percent over a twelve-month period in which the U.S. interest rates were falling rapidly relative to foreign rates and the current account deficit was in excess of $100 billion. Frankel and Froot (1986) observe that survey data suggested that even market participants expected the dollar to fall during this period. They conclude that the rise in the dollar in 1984 reflected irrational speculative behavior. Other studies have suggested that financial deregulation in Japan and elsewhere loosened "pent-up" demand for dollar assets that contributed to the continued rise in the dollar.[31] Whatever its cause, the rise in the dollar over this period, which had important implications for the U.S. external balance, apparently cannot be traced to the effects of shifts in macro policies through their impacts on real interest rates. We turn next to a quantitative analysis of the extent to

---

30. See, for example, Danker et al (1985) and Frankel (1982).
31. See, for example, Friedman and Sinai (1987) and Hayes, Hutchison and Mikesell (1986a).

which changes in fiscal and monetary policies did affect real interest rates, the dollar and the external deficit.

B. The Contribution of Shifts in U.S. and Foreign Macroeconomic Policies

Table 10 presents a combination of OECD and IMF estimates of the exogenous shifts in fiscal policy that occurred over the first half of the 1980s. These data suggest that changes in U.S. fiscal policy resulted in an expansion of the structural (exogenous) federal deficit by an amount equal to about 3-1/2 percent of GNP between 1980 and 1985. Over the same period changes in policies in other industrial countries resulted in contractions of structural government budget deficits equal to about 2-1/2 per cent of GNP on average. Although not shown in the table, since 1985 the United States has made some progress in reducing its structural deficit, while the position of the other countries, on average remains little changed.

Quantitative estimates of the effects of these fiscal policy shifts can be obtained from the results of policy simulations reported by a group of 12 multicountry models in a March 1986 Brookings conference.[32] The models were asked to simulate the effects of sustained exogenous shifts in government spending equal to 1 percent of baseline GNP both in the United States and in other OECD countries combined, while holding the growth of monetary aggregates exogenous. They were also asked to simulate the effects of an exogenous 4 percent increase in the U.S. M1 money

---

32. The conference was entitled "Empirical Macroeconomics for Interdependent Economies: Where Do We Stand?". The simulation results are reported and analyzed in detail in a forthcoming volume by Bryant et. al. (1988).

Table 10

Fiscal Policy: Cumulative Exogenous Changes in Budget Balances 1980-85 */
(as percent of GNP/GDP)

	IMF Fiscal Impulse (Central/Federal Government)	IMF Fiscal Impulse (General Government)	OECD Change in Structural Budget Balance (General Government)
Germany	2.9	4.4	3.2
Japan	1.5	3.5	3.6
United Kingdom	3.0	3.8	4.1
France	0.0	3.2	0.6
Italy	-0.5	0.8	-2.8
Canada	-2.4	-2.9	-3.4
Average of 6 above	1.2	2.8	2.0
United States	-3.7	-2.3	-2.4

*/ A positive number indicates a fiscal contraction, an increase in the structural budget surplus, or a reduction in the structural deficit.

Sources: IMF estimates: World Economic Outlook, April 1986.
OECD estimates: Economic Outlook, various issues.

stock. The average longer-run impacts on several key variables that were reported by 9 of these models are shown in Table 11.[33] The data shown are averages of wide ranges of results. However, all of the estimates in the ranges were generally consistent with the qualitative predictions of conventional macroeconomic theory as embodied in the extended Mundell-Flemming model. The mean estimates suggest that the U.S. fiscal expansion causes U.S. GNP to rise, and eventually leads 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 $14 to $20 billion decline in the current account balance. The foreign fiscal contraction also leads to an appreciation of the dollar and a decline in the U.S. current account balance. The average effect of the foreign fiscal shock on the real interest rate differential is negligible, however, and the exchange rate and current account effects are substantially smaller than in the case of the U.S. shock. A U.S. monetary contraction raises the real interest rate differential and the dollar's exchange rate, but it also reduces U.S. real income. With the rise in income tending to raise imports and the decline in the dollar working in the opposite direction to stimulate net exports, the U.S. monetary contraction has a negligible impact on the current account balance.

---

33. The models included in these averages are: the DRI model, the EC COMET model, the FRB Multicountry Model, Project LINK, the IMF staff's MINIMOD, the McKibben-Sachs Global model, the OECD staff's INTERLINK model, the Taylor rational expectations multicountry model, and the Wharton model. Also participating in the exercise were the Japanese EPA World Econometric Model, the Minford Liverpool model, and the Simms-Litterman World VAR model. The latter three models are not included in the averages shown in Table 10 either because they were unable to run the simulations as specified or because the results were clearly outliers.

Table 11

Simulated Impacts of Fiscal and Monetary Policy Shocks, Average of 9 Models

(Deviations from Baseline)

	U.S. Fiscal Expansion Equal to 1% of GNP		Foreign Fiscal Contraction Equal to 1% of GNP		4% Decline in U.S. M1 Money Stock	
	After 3 Years	After 5 Years	After 3 Years	After 5 Years	After 2 Years	After 5 Years
Impact on:						
U.S.-Foreign Long-Term Real Interest Rate Differential (percentage points)	1/2	1/2	0+	0+	1/2	0
OECD Dollar Real Exchange Rate (percent)	2	2-1/2	1	1-1/2	4	2-1/2
U.S. Current Account Balance (billions of $, AR)	-14	-20	-8	-8	0	0
U.S. CPI Level (percent)	1	2	-1/2	-1	-1-1/2	-2-1/2
U.S. Real GNP Level (percent)	1	1/2	-1/4	-0	-1	-1/2
Foreign (OECD) Real GNP Level (%)	-1/4	-1/4	-1-1/2	-1-1/4	-1/4	-1/4

Source: Calculated from Bryant et. al. (1988); see text.

The results in the first and third columns of Table 11 suggest that the U.S. fiscal expansion (equal to 3-1/2 per cent of GNP) and the foreign fiscal contraction (2-1/2 per cent of GNP), combined, accounted for less than one-third (or 3.5 x.5 percentage points + 2.5 x 0 percentage points = 1.75 percentage points) of the 6 percentage-point increase in the long-term real interest rate differential between late 1979 and early 1984 (that we saw in Chart 13). Similar calculations suggest that these shifts in U.S. and foreign fiscal policy accounted for about 10 percentage points or roughly one-fifth of the rise in the dollar and as much as $90 billion (or nearly two-thirds) of the widening of the current account deficit over that period.[34]

These estimates suggest that while the combination of fiscal expansion at home and fiscal contraction abroad accounted for as much as two-thirds of the current account deficit, they can explain at most one-third of the rise in the real interest differential and an even smaller portion of the rise in the dollar. Evidently, the changes in fiscal policy influenced the current account to a substantial degree through their impacts on relative growth of GNP and domestic demand in the United States and elsewhere. Based on the estimates in columns 1 and 3 of Table

---

34. That is, the U.S. fiscal expansion led to an estimated 3.5 x 2 percent = 7 percent rise in the dollar, and a 3.5 x $14 billion = $49 billion decline in the current account. The foreign fiscal contraction led to an estimated 2.5 x 1 percent = 2.5 percent rise in the dollar, and a 2.5 x $8 billion = $20 billion fall in the U.S. current account. The combined effects after three years are 9.5 percent and $69 billion, respectively. As indicated in Table 10, these estimates would be somewhat larger if the five-year impacts were used instead of the three-year effects. The three-year horizon is probably more pertinent to the dollar and the interest differential, both of which had peaked by early 1985. The longer horizon may be more pertinent to the current account deficit, which continued to widen through 1986. On a five-year horizon the current account effects are equal to 3.5 x 20 + 2.5 x 8 = $90 billion.

11, the shifts in U.S. and foreign fiscal policy raised the level of U.S. GNP by as much as 6 percentage points relative to foreign (OECD) GNP during the first half of the 1980s, substantially more than the actual GNP growth differential during that period (see Table 4).[35]

If, by process of elimination, we attribute the remaining two-thirds (or 4 percentage points) of the rise in the long-term real interest rate differential to a significant tightening of U.S. monetary policy relative to monetary policy abroad, beginning in late 1979, that shift in monetary policy can explain a substantial part of the rise in the dollar. The estimates in Table 11 suggest that for every 1/2 percentage point rise in the real interest rate differential in the case of a U.S. monetary tightening, the dollar rises by 4 percent in real terms, or a ratio of 8 to 1. (This impact is somewhat greater than the roughly 6 to 1 ratio illustrated in Chart 13.) Applying this 8 to 1 ratio to the 4 percentage point rise in the interest differential that is not "explained" by fiscal policy, the monetary tightening would account for something more than a 30 percent rise in the dollar.

At the same time, the average model simulation results suggest that the U.S. monetary tightening by itself does not explain any of the widening of the current account deficit. This is because the change in monetary policy induces a change in income that offsets the current

---

35. The estimate of a 6 percent growth gap resulting from the shift in fiscal policies was computed as follows. The U.S. fiscal expansion equal to 3-1/2 percent of GNP was multiplied by the 3/4 percent increase in U.S. minus foreign GNP that the average model simulations shown in Table 11 indicate would be the impact of a fiscal expansion equal to 1 percent of GNP. This product was then added to the product of a foreign fiscal contraction equal to 2-1/2 percent of GNP times the 1-1/4 percent increase in U.S. minus foreign GNP that would be induced by a 1 percent foreign fiscal contraction (also from Table 11).

account effect of the induced exchange rate change. A U.S. monetary tightening eight times as great as that shown in Table 11 would have reduced the level of U.S. GNP relative to foreign GNP by 6 percent. According to the models, the positive current account effects of this shift in relative GNPs were large enough to offset the negative effects of the rise in the dollar caused by the monetary restraint. On this basis, the monetary tightening also reduced the level of U.S. consumer prices by something on the order of 20 percent below where it would otherwise have been in the mid-1980s.[36]

In brief, based on the average predictions of a group of international macroeconomic models, the U.S. monetary tightening beginning in the latter part of 1979 resulted in a sharp runup in the real interest rate differential and the dollar; it also contributed significantly to the 1982 recession. As the fiscal stimulus took hold in 1982 and 1983 there was a strong recovery from the recession, which contributed further to the rise in the interest differential and the dollar. The current account did not fall substantially into deficit until 1983, when the recovery in GNP growth was under way and the lagged effects of the earlier appreciation of the dollar were beginning to have strong effects.

Our 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

---

36. This estimate is equal to 8 times the 5-year impact of the U.S. money shock on the CPI shown in Table 10. Since most of the models appear to show some tendency towards neutrality of money in the longer rum, the full price effect of the shock may well be somewhat greater in the longer run.

sector that took place during the first half of the 1980s. Taken together, 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 also appear to have reduced U.S. GNP growth somewhat, foreign GNP growth by a greater amount and the U.S. inflation rate by a substantial amount.[37] Explanations for the remaining one-third of the rise in the dollar and the widening of the current account deficit may be found in exchange market bubbles, the debt crisis (which interrupted the flow of new lending to and therefore the growth of major U.S. markets among developing countries), and other exogenous factors (animal spirits?) that may have raised U.S. growth relative to foreign growth.

Some words of caution about the interpretation of these results are in order. First, with respect to our estimates of the effects of shifts in fiscal policy, there is some inconsistency between the policy shifts that took place and the model simulations that were used. Perhaps most importantly, the model simulations were based on an increase in U.S. government spending, whereas the actual U.S. fiscal expansion was due primarily to a cut in taxes. Several of the models whose results we employ participated in a Brookings workshop in September 1985, for which they were asked to simulate a lump-sum federal tax cut and an increase in spending, both equal to 1 percent of baseline GNP. The tax cut had a 15 percent smaller impact on GNP, the dollar and the current account, than

---

37. The net negative impact on U.S. GNP growth is consistent with the shortfall of GNP growth relative to potential during the 1980s. Between 1980 and 1987 U.S. growth averaged only about 2.0 percent per year, well below most estimates of potential growth.

the spending increase, on average. A cut in tax rates could well have a somewhat smaller impact than a lump sum tax cut in many of these models. Simulations with the FRB Multicountry Model of the tax law changes in the Economic Recovery Tax Act of 1981 and the Tax Equity and Fiscal Responsibility Act of 1982 reported by Hooper (1985) show estimated impacts on the dollar and the current account that are about two-thirds as large as estimates based on the average multipliers reported above.[38]

Second, the "unexplained" portion of the current account deficit could well be greater than indicated in our estimates, inasmuch as developments in oil markets, including both oil price declines and the continuing response of U.S. consumption (hence imports) to earlier price increases, were working to reduce the deficit.

Finally, the quantitative estimates outlined above are based on averages of a wide range of results obtained from a variety of different models. These averages should be taken as no more than very crude indicators of the possible orders of magnitude of the quantitative effects of monetary and fiscal policy shifts. A recent study by Sachs and Roubini (1987) for example, finds that the U.S. current account deficit can be fully explained by a combination of changes in fiscal policy and the reduction of lending to developing countries. The model they employ was included in the March 1986 Brookings conference, and its estimate of the current account effects of a U.S. fiscal expansion was at the high end of the range, more than double the average estimate shown in Table 11.

---

38. The MCM simulations took into account, inter alia, the effect of the tax changes on the user cost of capital, estimated to be something in the neighborhood of -1 percentage point, on average.

VII. Microeconomic Factors: Pricing Behavior and Protection

We turn now to the microeconomic factors contributing to the widening and persistence of the current account deficit. In the previous sections of this paper, we argued that macroeconomic factors could explain the initital but not all of the widening of the deficit, nor the persistence of the deficit. Indeed, at the end of section V we found evidence in aggregate data (despite significant problems with those data) that changes in the pricing and profit-setting behavior of importers and exporters were contributing to the persistence of the deficit. In this section, we begin (in subsection A) by investigating microeconomic (or industry-level) evidence of changes in the behavior of prices and profit margins. Recalling the simple model of price determination presented earlier, we will, in section B, select industries that illustrate how the relationship between exchange rates and dollar import prices can be affected by (1) differences between products with respect to their sources or destinations, and (2) specific characteristics of the products and their marketplace. In subsection C we review the spread of protectionist policies at home and abroad, and consider the extent to which these policies may have contributed to the persistence of the deficit by prolonging the process of adjustment to the lower dollar. A summary of the material in this section is contained in subsection D.

A. Prices and Profit Margins

We found, at the end of Section V, that the equation for the nonoil import deflator significantly overpredicted in recent quarters, suggesting that import prices are adjusting more slowly to changes in the

exchange rate than they have in the past. However, this macro analysis was clouded to some extent by data problems: foreign consumer prices, used as a proxy for the costs of production, probably understate movements in the cost of production, and the import deflator may understate increases in import prices due to shifts in commodity composition (particularly involving the increasing share of business machinery). Our micro model showed how the failure to account for changes in input costs, or quantitative restraints could overstate the estimates of the pass-through of an exchange rate change to dollar import prices. In an effort to get around some of these data problems, and to more closely examine industry pricing behavior and exchange-rate pass-through, we turn now to an investigation of micro (industry-level) data.

Our analysis of disaggregated data uses a relatively small sample of industries. Table 12 lists the industries, which accounted for about 15 percent of U.S. imports and exports in 1980. These industries were chosen because they have the longest available series for import and export transactions prices. While not a large sample, it is representative of the predominant categories of imports and exports of the United States.

In the past, an analysis of the behavior of trade prices at the industry level has depended on unit value data as proxies for price movements. However, the Bureau of Labor Statistics has recently begun publishing transactions prices for imports and exports disaggregated according to the 4-digit SIC, the 5-digit SITC, and the 4-digit end-use

Table 12

SIC Code Number and SIC Product Category Name

IMPORTS

2311	Men's and boy's suits and costs (certain apparel)
2621	Paper mill products
2221	Weaving mill products, sythetics, silks (certain textiles)
2033	Canned fruits and vegetables
314	Men's and women's leather footwear (3313 + 3314)
331	Rolling mill and electrometalurgical steels (3312 + 3313)
3531	Construction machinery

EXPORTS

2611	Pulp mill products
2011	Meat packing and preparations
3494	Valves and pipe fittings
3519	Internal combustion engines
3523	Farm machinery and equipment
3533	Oilfield and gasfield equipment
3546	Power-driven hand tools
3555	Printing trades machinery
3674	Semiconductor devices

classification.[39] These prices, which are transactions prices obtained from a survey of a selected sample of industries, are available quarterly, one observation per quarter (usually the observation is the third month of the quarter). Both the import and the export prices are indexed in dollar terms.

Unfortunately, most of the series start only in 1980 or later. For the analysis in this paper, we wanted to compare periods of appreciation and depreciation, and compare the current depreciation with an earlier depreciation. Thus, we wanted a sample that included at least the depreciation in the late 1970s. The industries in Table 12 are the only ones that go back that far.

1. Constructing Indexes of Industry-Specific Profit Margins

An index of profit margins for U.S. exports of each SIC category was calculated in dollar terms, as the ratio of each product's BLS export price index to its matched U.S. producer price index. We used the industry-specific producer price index as a proxy for the costs of production of the good in the United States. Since producer price indexes include a profit margin at the wholesale level, they overstate the true costs of production. Thus, the constructed index of exporter's profit margins captures both price discrimination -- the extent to which

---

39. We used the SIC disaggregation primarily because most U.S. data at the industry level are available according to the SIC scheme. In particular, U.S. producer price indexes are available according to the SIC. In addition, U.S. indexes of industrial production and some annual trade value data are disaggregated according to the SIC. On the other hand, obtaining trade data for country-industry pairs on an SIC basis remains quite difficult. We have used several different schemes to construct matched country-industry trade data.

profit margins differ between exporting versus selling the same product in the United States -- and movements in price-cost margins. We will be unable to distinquish between the two. However, to the extent that we are interested in the differential margin applied to the international market, and the possible consequence of changes in this margin for international competitiveness, the extra margin embodied in the producer price index is not a problem. But, it should be noted that nothing can be inferred from the level of this index because the choice of base year was arbitrary.

For imports, the study examines foreign currency profit margins on the assumption that a foreign firm maximizes profits measured in its own currency. Therefore, each product's BLS import price index must be converted to foreign currency units. An index of nominal exchange rates weighted by imports share was created for each product.[40] Multiplying this index by the BLS index of dollar import prices yields an index of import prices in foreign currency terms. Multiplying the import-share weights by each country's proxy for the product's production costs creates an index of foreign currency costs of production for each

---

40. In concept, the import share weights are the share each foreign country has in the total imports into the United States of a particular four-digit SIC category of product. However, disaggregated trade data by individual countries are available only on a Schedule A disaggregated basis. Therefore, the import-share weights are based on Schedule A, with a concordance between Schedule A and the SIC used to determine which 6-digit Schedule A categories to aggregate to get the four-digit SIC category. The share weights were calculated for the top three to five supplying countries for 1980 and 1984, interpolating for the intervening years. This technique accounted for an average of 80 percent of the imports of each four-digit SIC category, ranging from a low of 66 perent for steel to a high of 89 percent for footwear. The average values for the exchange rate index were used for the fraction not allocated to any particular country.

imported good. Since foreign countries have their own industry disaggregation schemes, there is no breakdown for foreign costs of production that exactly match the disaggregated SIC-based import price data. Thus, the analysis relies on the producer price index from national sources most nearly equivalent to the 4-digit SIC scheme.[41] The ratio of the indexes of foreign currency import prices and of foreign currency costs of production forms an index of foreign currency profit margins for each import.

2. Behavior of Prices and Profit Margins of Specific Industries

Chart 14 shows the behavior of prices and profit margins for the imported products. Table 13 shows the level and percent change in the index of profit margins calculated in foreign currency terms for the periods of dollar appreciation and depreciation over the last 10 years.[42] The general pattern that emerges is that profit margins bear the brunt of

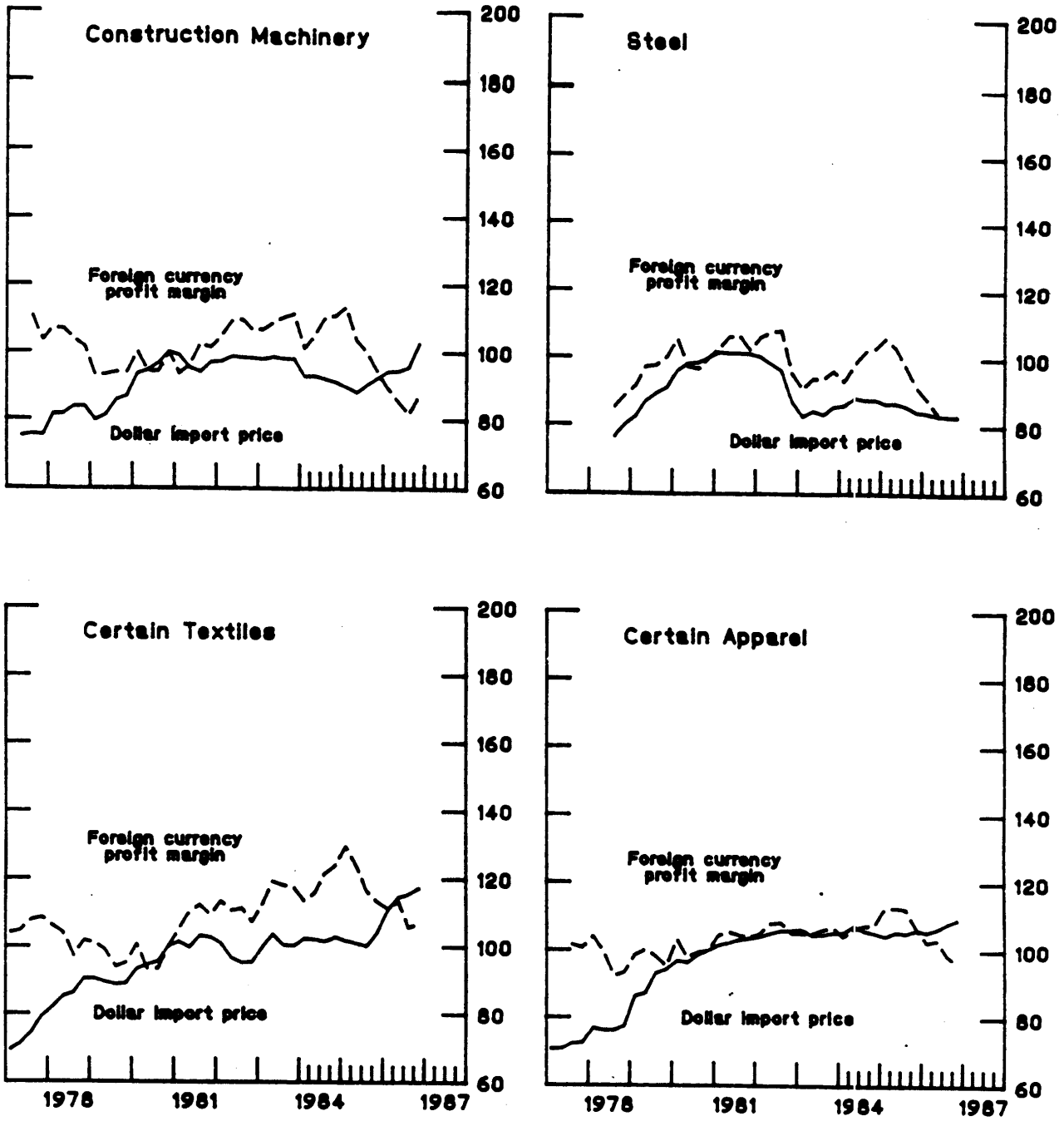
---

41. The following sources were used: For Canada: industry selling price indexes based on 1970 Standard Industrial Classification, Statistics Canada, Canadian Statisitical Review. For Japan: wholesale price indexes (by products and sectors), Bank of Japan, Statistical Bulletin. For Brazil: precos por atacado (nova classificacao), offerta global, Conjuntura Economica, National Economic Indexes. For United Kingdom: index numbers of wholesale (producer) prices, price indexes of output of broad sectors of industry, Central Statistical Office, Government Statistical Service, Monthly Digest of Statistics. For Germany: priese und Priesindizer fur gewerbliche produkte (erzeugerpreise), W. Kohlhammer GMBH, Statistisches Bundesamt Wiesbaden. For Italy: Numeri indici prezzi all ingrosso, indici per settori e branche, indici alcuri gruppi, Institutio Centrale de Statistica, Bollettino Mensile Da Statistical. For South Korea: Wholesale price indexes (by commodity by subgroup), Bank of Korea, Monthly Statistical Bulletin. For Taiwan: indexes of wholesale prices in Taiwan area, Executive Yuan Republic of China, Directorate-Generale of Budget Accounting and Statistics, Monthly Statistics of the Republic of China.

42. Generally speaking, 1977 to mid-1980, and 1985:2 to the present were periods of dollar depreciation, and mid-1980 to 1985:2 the period of dollar appreciation. See the top panel of Chart 6.

Chart 14

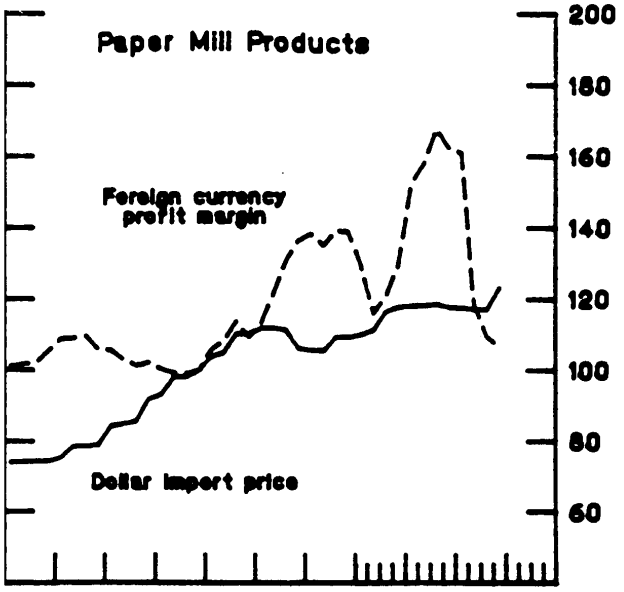
Prices and Profit Margins - Imports
(Index 1980:4 = 100)

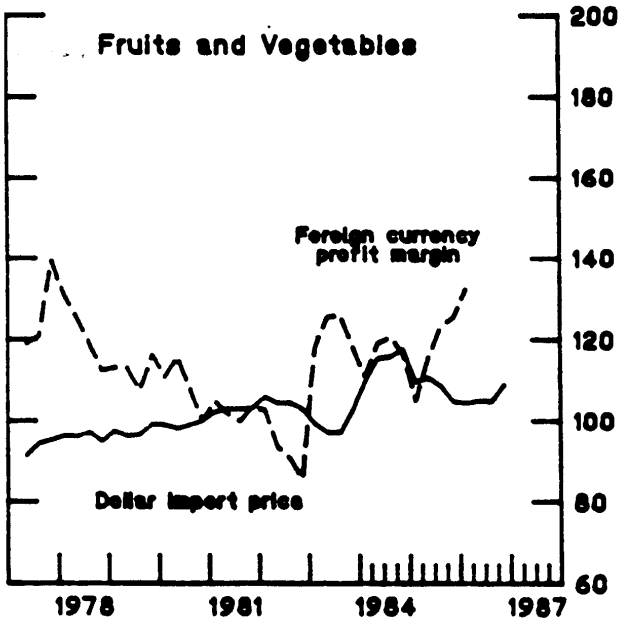


Source: See Text

Chart 14 - Continued

Prices and Profit Margins - Imports: Continued
(Index 1980:4 = 100)





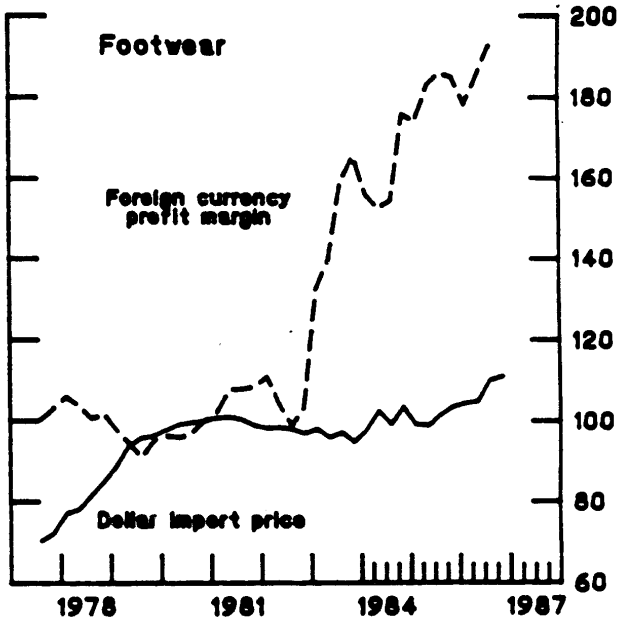


Table 13

Index of Profit Margins -- Imports
(1980:4=100)

SIC	NAME	1977[1]	1980[1]	1985:2[2]	1986:4[1]
314*	footwear	101.62	97.34	178.47	192.77
2033*	fruit & vegs.	126.41	108.51	110.21	132.21
222	textiles	106.36	96.87	126.70	106.28
3531*	construction mach.	106.92	97.19	108.50	84.64
262	pulpmill	102.56	99.50	155.13	107.79
231*	apparel	101.04	100.11	112.76	97.28
331*	steel	87.06	99.71	104.51	85.95

Percent Change in Index of Profit Margins

SIC	NAME	77-80	80-85:2	85:2 - 86:4
314*	footwear	-4.2	83.3	8.0
2033*	fruit & vegs.	-14.2	1.6	20.0
222	textiles	-8.9	30.8	-16.1
3531*	construction mach.	-9.1	11.6	-22.0
262	pulpmill	-3.0	55.9	-30.5
231*	apparel	-1.0	12.6	-13.7
331*	steel	2.7	4.8	-17.8

1/ Average of 4 quarters in 1977, 1980.
2/ Average of 1985:1 and 1985:2.
3/ Average of 1986:3 and 1986:4.
* 314, average of 1977:3, :4, and point estimate 1986:3.
* 2033, average of 1977:2, :3, :4, and point estimate 1986:1.
* 3531, average of 1977:3, :4.
* 231, average of 1977:3, :4.
* 331, average of 1978:3, :4.

changes in exchange rates and foreign costs, leaving U.S. dollar prices of imports less variable than they would be if prices were set simply as a mark-up over costs. This evidence for specific industries contrasts with the evidence from aggregate data, which suggested relatively small changes in profit margins until quite recently. The difference between the aggregate and the disaggregate may be due in part to the difference between consumer price and wholesale price indexes, as noted earlier.

Chart 14 and Table 13 also suggest that during both periods of dollar depreciation, importers squeezed profit margins in their own currency, while during the long appreciation of the dollar, profit margins widened. This behavior of foreigner's profit margins is quite important for the persistence of the deficit. As foreign importers cut profit margins and delay the pass-through of exchange rate changes to increases in dollar import prices, the turnaround in the current account is also delayed.

The vital question is, how long can the foreigners continue to squeeze margins? In other words, is this source of persistence in the U.S. external deficit likely to be temporary or sustained? For some products (steel, construction machinery, certain apparel, and certain textiles), the index of foreign currency profit margins has reached or fallen below levels seen in the beginning of the sample period, during the last dollar depreciation in the late 1970s. (See Table 13, top panel.) Whether that level represents a lower bound for margins cannot be determined from these data. But, since margins overall increased during the years of appreciation, foreign suppliers might be able to endure abnormally low margins for awhile during the current depreciation. The recent squeezing of profits may also be due to relatively slack

demand and low levels of resource utilization abroad, which has induced foreign firms to try harder to maintain their shares of the U.S. market. To the extent that such cyclical factors are at work, we can expect margins eventually to rebound to normal levels, thus leading ultimately to a rise in import prices. This suggests that significant adjustment of the U.S. external deficit in real terms to the depreciation that has already taken place is still in the pipeline.

Alternatively, it may be that foreign firms are reducing export prices to the U.S. market, while enjoying a normal level of profits on exports to other countries (or on other, nonmanufacturing activities). If so, then these firms could continue to essentially subsidize prices to the U.S. market until the dollar stabilizes. We saw in Chart 10 some evidence that Japanese exporters have been reducing their profits on exports to other countries less than those on exports to the United States. Or, there is evidence in Table 13 that for certain industries, profit margins have not yet reached their lowest levels. Either of these scenarios suggests that the change in the dollar to date has completed its impact on dollar import prices, and the further changes in the dollar would be necessary to reduce margins or raise import prices.

The overall picture presented by the microeconomic data we have reviewed shows a willingness of foreign firms to reduce profit margins significantly to maintain market share. A delay in the adjustment of U.S. import prices to the dollar's decline has important implications for real net exports, but a much smaller impact on nominal imports in the longer run (given a price elasticity in the neighborhood of unity). If foreign firms are reducing their margins on exports to third markets as well, this affects the competitiveness of U.S. exports and could be

adding significantly to the persistence of the nominal deficit as well as the real deficit.

Chart 15 shows the behavior of prices and profit margins for the sample of U.S. exports. Table 14 shows the level and percent change in the profit margin index for U.S. exports for the periods of dollar appreciation and depreciation. Profit margins are remarkably stable, apparently unaffected by external developments.[43] This corroborates the finding of a stable coefficient of 1 on the domestic price term in the equation for the non-agricultural export deflator: U.S. exporters do not price-discriminate in international markets, and price their exports off of domestic costs.

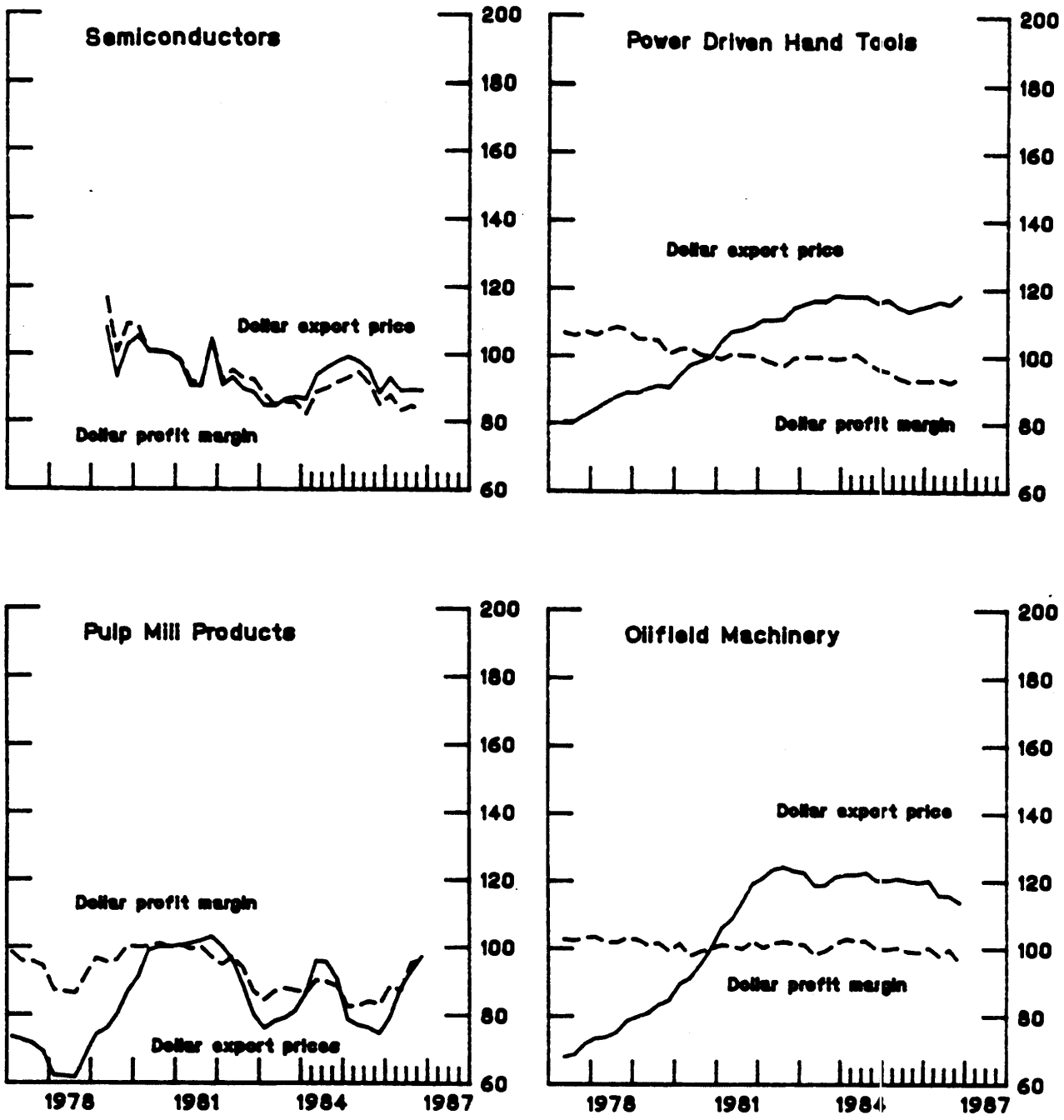
Because profit margins do not move very much, we can infer that movements in U.S. export prices have been dominated by movements in costs of production, rising rapidly during the relatively high inflation 1970s and then stabilizing in the 1980s. U.S. exporters adjusted export prices and profit margins very little in the face of the significant dollar appreciation. Not only did U.S. exporters (except for semiconductors) fail to absorb any of the rise in the dollar, in most cases the dollar export price rose as the dollar appreciated. Although no different from historical experience, this myopic behavior resulted in a significant loss of competitiveness as foreign currency prices shot-up. This may have contributed to the widening of the deficit, especially as foreign growth sagged.

---

43. Charts 14 and 15 have the same scales to facilitate comparison between industries.

Chart 15

Prices and Profit Margins - Exports
(Index 1980:4 = 100)



Source: See Text

However, over the last year, there may have been some change in the pricing policy of U.S. exporters. In particular, there is some evidence that export prices of some products have fallen recently, with producers cutting profit margins as the dollar depreciates instead of expanding margins when the domestic currency depreciates (which is what foreign importers did in the period of dollar appreciation) or keeping margins unchanged (which is the historical pattern for U.S. exporters). In the case of semiconductors, power-driven hand tools, and oilfield machinery, the cuts in margins are particularly pronounced. This behavior could reflect persistent competition from foreign producers who have been willing to sacrifice profits for a time at least. It could also signal a more aggressive pricing strategy on the part of U.S. producers, or quite differently, cyclical weakness in particular industries (oil and computers, in particular).

In summary, there are two stylized facts about the behavior of prices and profit margins. First, because foreign producers use profit margins to buffer changes in the exchange rate, dollar import prices are not now rising very quickly. Second, U.S. export prices have been unaffected by movements in the exchange rate and profit margins have been stable; but this behavior might be changing. These stylized facts and deviations from them suggest the importance of product source and destination (the $I(w,r,k)$ and E in equation (16)), market structure and competition (the λ in equation (16)), and protection (the $\hat{Q}$ in equation (17)).

B. Explaining the Behavior of Prices and Profit Margins

1. Geographical Explanations, and the "Real" Real Exchange Rate

One explanation for the deviation of the behavior of prices and profit margins on some products from the stylized facts is that some of these imports and exports have actually faced little change in real exchange rates. That is, in some cases prices and profit margins have not "responded" to real exchange rate changes because the real exchange rate for the product has not moved. In the structure of the micro-model, everything else equal, small changes in $\hat{E}$ would lead to small changes in $\hat{P}^{\$}$. If, in the aggregate equations, we overstate the real exchange rate movement, we would estimate a larger change in dollar import prices than we would actually observe.

Table 15 shows the source of imports and the destination of exports for each for the products in the sample. These shares are used to construct product-specific real and nominal exchange rates.[44] For each imported good, we constructed a source-weighted real exchange rate index using IMF data for the nominal exchange rates and consumer price indexes from national sources to deflate to obtain the real exchange rate. For each exported product, we constructed a destination-weighted

---

44. These shares are based on a relatively more aggregated set of Schedule A data than are the shares used in the construction of the foreign currency profit margins. These shares are based on data which are available for some individual trading parters and some regions of the world. In particular, industry specific data are not broken out for individual trading partners in Latin America and Asia n.e.c (comprised primarily of South Korea, Hong Kong, Singapore, and Taiwan). For these regions, we chose the nominal exchange rate and consumer price index for a representative country -- Brazil represents Latin America and Korea represents Asia.

Data for Canada, Japan, Germany and United Kingdom are available. But, other countries in Western Europe are not broken out. Thus, for the rest of Western Europe, we used a multilateral trade-weighted average of data for Belgium, France, Italy, the Netherlands, Sweden, and Switzerland -- the G-10 countries less the big four.

The line-item "rest-of-world" is the share of trade in the product that was not allocated to any of these regions or countries.

Chart 15 - Continued

Prices and Profit Margins - Exports: Continued
(Index 1980:4 = 100)

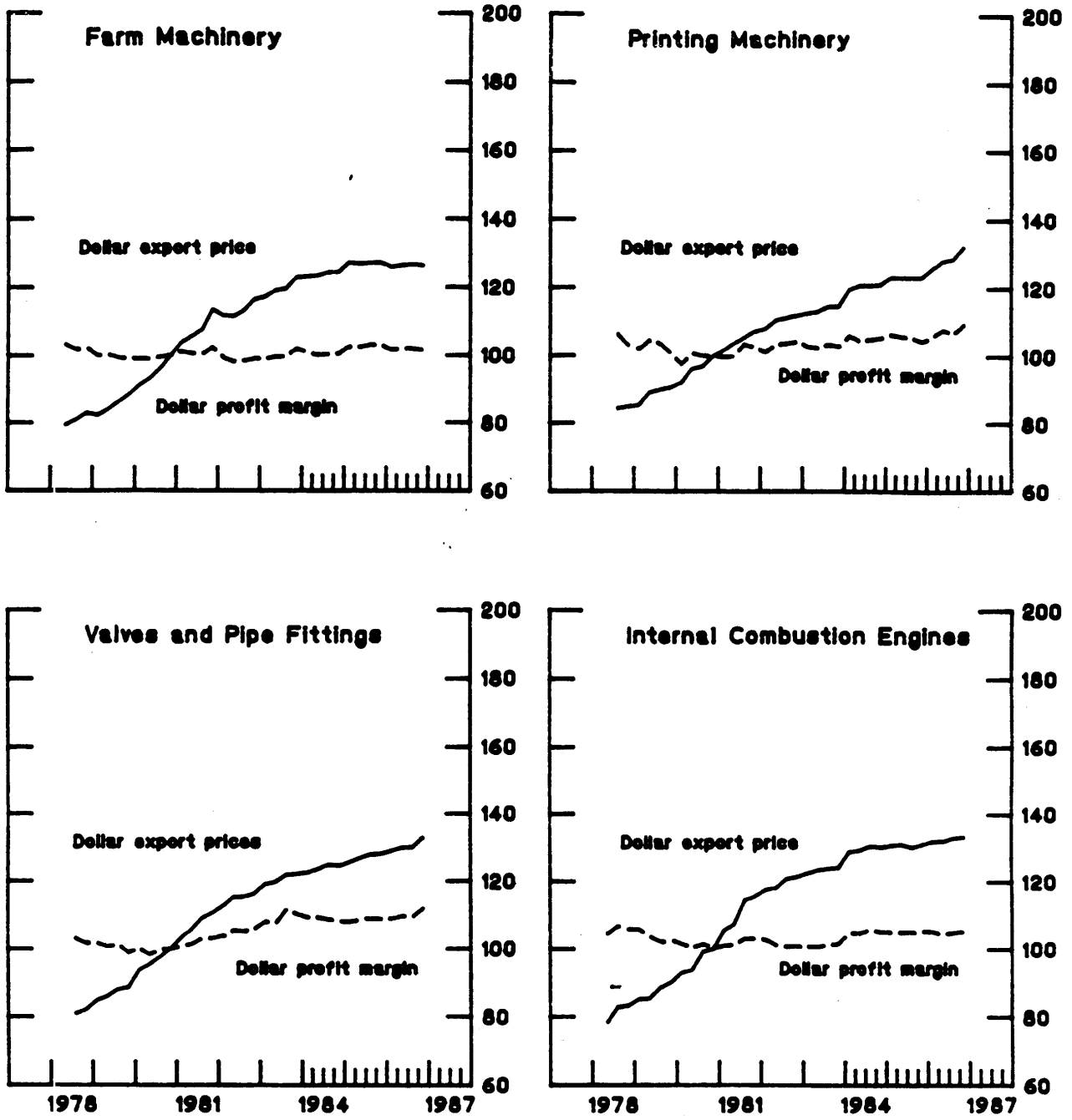


Table 14

Index of Profit Margins -- Exports
(1980:4=100)

SIC	NAME	1977[1]	1980[1]	1985:2[2]	1986:4[3]
261	paper	96.06	100.30	82.67	95.91
2011*	meat packing	96.62	92.83	110.79	124.74
3494*	valves etc.	102.32	99.57	108.24	110.71
3519*	engines	105.61	100.77	104.97	105.10
3523*	farm mach.	102.34	99.38	102.37	101.52
3533*	oil mach.	102.65	99.61	99.98	97.93
3546*	power tools	106.61	101.33	94.43	93.13
3555*	printing mach.	104.55	99.51	105.93	107.92
3674*	semiconductors	108.68	102.25	93.55	83.89

Percent Change in Index of Profit Margins

SIC	NAME	77-80	80-85:2	85:2 - 86:4
261	paper	4.4	-17.6	16.0
2011*	meat packing	-3.9	19.3	12.6
3494*	valves etc.	-2.7	8.7	2.3
3519*	engines	-4.6	4.2	0.0
3523*	farm mach.	-2.9	3.0	-1.0
3533*	oil mach.	-3.0	0.4	-2.1
3546*	power tools	-5.0	-6.8	-1.4
3555*	printing mach.	-4.8	6.5	1.9
3674*	semiconductors	-5.9	-8.5	-10.3

1/ Average of 4 quarters in 1977, 1980.
2/ Average of 1985:1 and 1985:2.
3/ Average of 1986:3 and 1986:4.
* 2011, average of 1977:2, :3, :4.
* 3494, average of 1978:3, :4.
* 3519, average of 1978:2, :3, :4.
* 3523, average of 1978:2, :3, :4.
* 3533, average of 1977:2, :3, :4.
* 3546, average of 1977:2, :3, :4.
* 3555, average of 1978:3, :4.
* 3674, average of 1979:2, :3, :4.

Table 15

Sources of Imports and Destination of Exports
(share in 1986, value terms)

EXPORTS

	Canada	Brazil[1]	Korea[2]	G-6[3]	U.K.	Germany	Japan	ROW[4]
2611	.059	.108	.136	.208	.072	.095	.209	.118
2011	.140	.060	.061	.057	--	--	.390	.292
3494	.299	.126	.065	.088	.059	.041	.123	.199
3546	.254	.148	.050	.130	.083	.058	--	.277
3674	.140	.062	.069	.236	.124	.105	.088	.176
3523	.438	.137	--	.072	--	--	--	.353
3533	.065	.216	.112	.058	.071	--	--	.478
3519	.929	--	--	--	--	--	--	.071
3555	.153	.148	--	.203	.097	.070	--	.329

IMPORTS

	Canada	Brazil	Korea	G-6	U.K.	Germany	Japan	ROW
2033	--	.586	.138	--	--	--	--	.276
2221	--	--	.270	.240	.050	--	.300	.150
231	--	.085	.665	.075	--	--	--	.175
3531	.195	--	--	.135	.090	.230	.195	.155
2621	.795	--	--	--	--	--	--	.205
314	--	.148	.463	.220	--	--	--	.169
331	.110	.065	.058	.155	.040	.100	.370	.102

Source: FT990
1/ Represents Latin America
2/ Represents Asia nec.
3/ G-6 is Belgium, France, Italy, Netherlands, Sweden, Switzerland.
4/ Rest-of-World.

real exchange rate using the same methodology. We assumed that the region "rest-of-world" behaved as the simple average of all regions, except Brazil.[45]

The top panel of Table 15 shows the degree to which Canada and Western Europe are major destinations for manufactured exports. Latin America (represented by Brazil) is also a major export trading partner.[46] On the other hand, Japan is not well represented in any of the export categories -- a fact frequently used to support notions of "unfair" trading practices. The unallocated part of the world is quite large for certain categories -- oilfield machinery, farm machinery, and printing machinery. Thus averaging all countries to represent the residual may mask the effect of the destination-weighted exchange rate on the export price. The bottom panel suggests the importance of Asia (represented by Korea) and Western Europe as import trading partners. It also suggests that the source of imports is more concentrated than is the destination for exports. It is important to note that these weights are, in some cases, quite different from the weighting schemes used in the aggregate equations.[47]

---

45. Brazil's exchange rate and consumer price performance have been so spectacular that we did not want to accord it any greater weight than was appropriate based on the share data. This also brings up the argument over multilateral versus bilateral weighting schemes. No doubt multilateral schemes are superior on the export side because of the importance of competition from third countries. To a certain extent we have accounted for that though the average weighting on the residual world.
46. The importance of Brazil as a destination for exports may be understated somewhat because the year chosen for the fixed-share-weights is 1986. In any case, the potential impact of the debt crisis is clear from the breadth of the trading relationship.
47. See Pauls (1987) for a more thorough discussion of weighting schemes.

In Chart 12 (Section VI) we noted that the currencies of industrial countries had moved quite differently from those of developing countries, on average. In fact, significant differences can be observed within the G-10 index as the Canadian dollar has remained much more stable than other currencies against the dollar. If movement in the real exchange rate is an important determinant of pricing strategies of foreign exporters, we might not observe large changes in prices or profit margins on products sourced primarily from countries whose currencies have not risen against the dollar.

For the same reason, the competitiveness of U.S. exports in the domestic markets of Canada, Latin America, and Asia, for example, has not changed nearly as much over the last six years as would be suggested by an aggregate real exchange rate index. Thus, even if some U.S. exporters are becoming more strategic in their response to exchange rate movements, we may not observe much in the way of changes in export prices and margins of products destined primarily for these markets.

Table 16 pulls together, for exports, a variety of information on destinations, changes in prices, profit margins, and destination-weighted real exchange rates. This table concentrates on the most recent period of dollar depreciation in order to focus on the persistence of the deficit looking at the export side. Column 1 shows the change in the destination-weighted real exchange rate for the specific product; the products are ranked according to the change in this variable. Column 2 shows the share of exports destined for areas where the dollar has not fallen in real terms; this ranking is not too dissimilar from the one

Table 16

The Behavior of Prices, Profit Margins, and Exchange Rates Between 1985:2 and 1986:4

EXPORTS

SIC	NAME	%ΔRXR[1] (1)	Share[2] (2)	%ΔPX[3] (3)	%ΔV[4] ($)	%ΔPX/%ΔRXR[5] (5)	%ΔV/%ΔRXR[6] (6)
3519	engines	-3.6	93%	1.7	0.0	-0.47	-0.03
3523	farm mach.	-12.9	57%	0.0	0.8	0.0	0.06
3546	power tool	-16.8	45%	1.1	-1.3	-0.07	0.08
3533	oil mach.	-17.5	39%	-4.8	-2.1	0.27	0.12
3494	valves etc.	-17.6	50%	4.1	2.3	-0.23	-0.13
3555	printing mach.	-21.1	30%	5.8	1.9	-0.27	-0.09
3674	semiconductor	-22.7	27%	-9.4	-10.2	0.69	0.45
261	paper	-24.9	31%	4.4	15.9	-0.87	-0.64
2011	meat pkg.	-25.1	28%	19.4	23.9	-0.77	-0.95

1/ %ΔRXR - percent change destination-weighted real exchange rate.
2/ Share - share of exports of SIC category destined for Canada, Korea, Brazil.
3/ %ΔPX - percent change in BLS export price.
4/ %ΔV - percent change in profit margin.
5/ %ΔPX/%ΔRXR - percent change export price divided by percent change real exchange rate.
6/ %ΔV/%ΔRXR - percent change profit margin divided by percent change real exchange rate.

based on the real exchange rate.[48] Column 3 shows the change in the export price, column 4 the change in the profit margin, column 5 the ratio of the change in price to change in real exchange rate, and column 6, the ratio of the change in margin to change in real exchange rate.

It appears from all this information that export prices have risen relatively little in general, which is consistent with the behavior of the non-agricultural deflator. However, it appears that export prices may have risen relatively less on certain products (farm machinery, internal combustion engines, and power-driven hand tools) destined for markets where the dollar has not fallen as much in real terms. This supports the hypothesis that pricing is now more attuned to international competitiveness. That is, where U.S. exporters have not gained in competitiveness simply on account of changes in the exchange rate, they are trying to improve competitiveness through their export pricing strategy. We support this story by noting that margins, column 4, have risen only a little or have been squeezed on these products. Thus the movement in export prices cannot be fully accounted for by stable costs of production.

In markets where U.S. exporters have gained competitiveness substantially on account of movements in the real exchange rate, price increases are still modest, although somewhat larger (valves and pipe fittings, printing trades machinery, meat packing, and pulp mill products). Margins have increased on these products.

---

48. The two rankings are not identical because the weights on other countries will vary, and movements in the real exchange rates of those destinations can be quite different.

Column 5, which shows the ratio of the change in the price to the change in the real exchange rate, is a point estimate of the product-specific pass-through observed to date.[49] For some exports, (printing, valves, and engines) this point estimate of pass-through is close to the estimated coefficient in the aggregate equation. Other producers (especially meat packing and pulp mills) are apparently using the exchange rate change to increase prices in domestic currency terms without any deterioration of the competitive position when measured in foreign currency terms -- the same strategy used by the foreign importers during the dollar appreciation. But, for other producers (farm machinery, hand tools, oil machinery, and semiconductors) the point estimate for pass-through is much lower than or of the opposite sign from the coefficient as estimated with aggregate data.

The behavior of import prices, profit margins, and the product-specific source-weighted exchange rate for <u>imports</u> is displayed in Table 17. As in the table on exports, this table concentrates on the most recent period of dollar depreciation so as to focus on the persistence of the deficit looking at the import side. Column 1 shows the change in the source-weighted real exchange rate for the specific product; the products are ranked according to the change in this variable. Column 2 shows the share of imports destined for areas where the dollar has not fallen in real terms; again, this ranking is not too dissimilar from one

---

49. The coefficient in the aggregate equation is the sum of about eight lags, although almost all of the pass-through occurs in the first two quarters. This point estimate takes the average for two quarters, thus to some extent accounting for lagged affects.

Another very important difference is that the nominal exchange rate is used in the agregate equations, while the point-estimate calculated here uses the real exchange rate.

based on sources. It also appears that there may be a distinction in the behavior of the real exchange rate and sourcing patterns for consumer-type goods and capital-type goods. (If we eliminate textiles from the "capital-goods" group, it is a perfect match.) Column 3 shows the change in the import price in dollars, column 4 the change in the foreign currency profit margin, column 5 the ratio of the change in price to change in real exchange rate, and column 6, the ratio of the change in margin to change in real exchange rate.

It appears that dollar import prices have risen relatively more on products sourced from countries where the dollar has fallen the most in real terms (construction machinery, certain textiles). But, profit margins in foreign currency terms have fallen the most on these same products, suggesting that producers in Europe and Japan have both needed to, and have made the greatest effort to, offset the loss in competitiveness coming from the appreciation of their currencies.

Dollar prices of some products sourced from countries against which the dollar has stayed relatively flat in real terms (fruits and vegetables, certain apparel, and paper products) have changed only a little, and foreign currency profit margins of some of these foreign importers in their own currencies have continued the rising trend observed during the period of strong dollar appreciation (fruits, shoes). For these goods, since there has been little or no loss in competitiveness coming directly from changes in the dollar, there has been little need to adjust margins. Since these margins have continued to expand, it appears that these producers also have been able to more than pass on changes in their costs of production. On the other hand, the margin on certain apparel has fallen despite an increase in the price,

suggesting that in this case producers may not have been able to fully pass on increases in the cost of production.

Looking at the point estimate of the pass-through of the real exchange rate change into dollar prices, column 5, we see that in most cases it is well below the coefficient in the aggregate import unit value equation.[50] This corroborates other evidence that suggests that pass-through has been delayed.

2. Explanations Based on Product and Market Characteristics

In this section we consider the possibility that the characteristics of the product (i.e., the extent to which it is homogeneous or heterogeneous) and the characteristics of the market (i.e., whether it is a market with a substantial degree of foreign competition) might help explain the stylized facts about pricing behavior outlined earlier. Essentially, we are looking for examples where the relationship between the mark-up (λ) and the exchange rate (E) in equation (17) might have changed. For example, movements in the exchange rate may affect the introduction into the market of new products that are substitutable for the product in question. Or, exchange rate changes may affect the pricing behavior of other firms or alter the number of firms in the market, thus changing the perceived elasticity of demand of the industry in question.

The stylized fact that U.S. export prices historically have been determined mostly by movements in internal prices and very little by external events, is consistent with the fact that United States is a

---

50. The problems noted in the previous footnote also apply here.

large domestic market with most competition occurring among domestic firms who are subject to, more-or-less, the same changes in costs of production. In this view, exports are a residual market and, therefore, developing a separate pricing policy dependent on movements in the exchange rate is not worth the menu costs.

Deviations from this scenario might be due to a change in the importance of the international market for some U.S. industries. As these industries become more dependent on international sales, producers may become more attuned to the effect of exchange rate changes on the price of their product in overseas markets. Moreover, if the product is relatively homogeneous, or does not enjoy brand loyalty, export prices might become more sensitive to exchange rate movements as exports become a larger share of industry output.[51] And, as the international market becomes more important, domestic producers must consider the pricing policies of their foreign competitors in third markets when choosing their own pricing strategy.

Table 18 shows an index for each industry of exposure of domestic production to export sales. Each SIC-based export exposure index is calculated as the ratio of the SIC-based export volume index[52] to the SIC-based industrial production index. Column 4 shows the implied average annual change in the exposure index. High average annual

---

51. Aggressive export pricing leads to a greater share of domestic production sold in the export market. A greater share of domestic production sold as exports encourages aggressive export pricing. Clearly a chicken and egg problem.

52. Trade volume is constructed from annual trade value data that are available by SIC (it is only for industry-country pairs that SIC data are not available in a time series form) and the matched SIC-based BLS transactions price data. Trade volume is indexed to 1980 to match the index of industrial production.

Table 18

Index of Export Exposure[1]
(1980=100)

SIC (1)	Name	1977 (2)	1986 (3)	Average Annual Change (4)
3674*	semicond.	87.7	137.6	6.2
3533	oil mach.	58.4	86.2	2.8
3494*	valves etc.	87.8	68.7	-2.1
2611	paper	78.1	96.4	1.8
3519*	engines	96.6	82.9	-1.5
3555*	printing mach.	76.5	66.6	-1.1
2011	meat pkg.	102.1	109.2	0.7
3523*	farm mach.	76.7	74.3	-0.3

*Figures shown are for 1978 not 1977.
1/ Export volume index divided by industrial production index.

(No index of industrial production, so export exposure index could not be constructed for SIC 3546 power-driven hand tools.)

changes suggest that the export market is consuming an increasing percentage of domestic production. (The index says nothing about whether export volume is or is not increasing.) A negative average annual change suggests that the export market is becoming relatively less important as an outlet for domestic production.

Industries with high average annual increases in exposure can be expected to be relatively more attuned to changes in the international environment. In particular, these industries might give more consideration to the role of the exchange rate in their pricing policies. In fact, the industries with the greatest exposure are semiconductors and oil-field machinery, which are also industries where export prices have been squeezed (refer back to Table 16).[53]

On the other hand, industries where the average annual change in the index of international exposure is low or negative, can be expected to remain unconcerned with movements in the exchange rate. We would expect to see stable margins as export prices key directly off of domestic prices. Farm machinery, printing trades machinery, and internal combustion engines, have low or negative annual averages for changes in export exposure, they also are industries with stable margins (Table 15).[54]

---

53. There could be spurious correlation between export exposure and export pricing. For example, the behavior of export prices for semiconductors and oilfield machinery could simply be a result of industry slump.

53. The stable margins and low annual change in export exposure could be a result of long-term contracts. For example, contracts or accounting issues may affect the prices of internal combustion engines traded between subsidiaries of the major car companies in the United States and Canada more than does the exchange rate or export exposure.

The inherent heterogeneity of many manufactured products may partially explain why U.S. exports in general do not respond much to exchange rate movements. Ceteris paribus, the more heterogeneous the good, the larger prices changes can be before the customer will incur the menu costs required to move to a new supplier. This assumes no new entrants producing similar goods, and no strategic pricing on the part of existing competitors. On the other hand, the more foreign producers introduce new goods with characteristics similar to the products currently in the market, the more existing domestic producers need to adjust prices to take into account exchange rate changes. In addition, if existing competitors take into account exchange rate changes in their pricing decisions, but U.S. producers do not, then the U.S. producer effectively becomes relatively less competitive when the dollar appreciates.

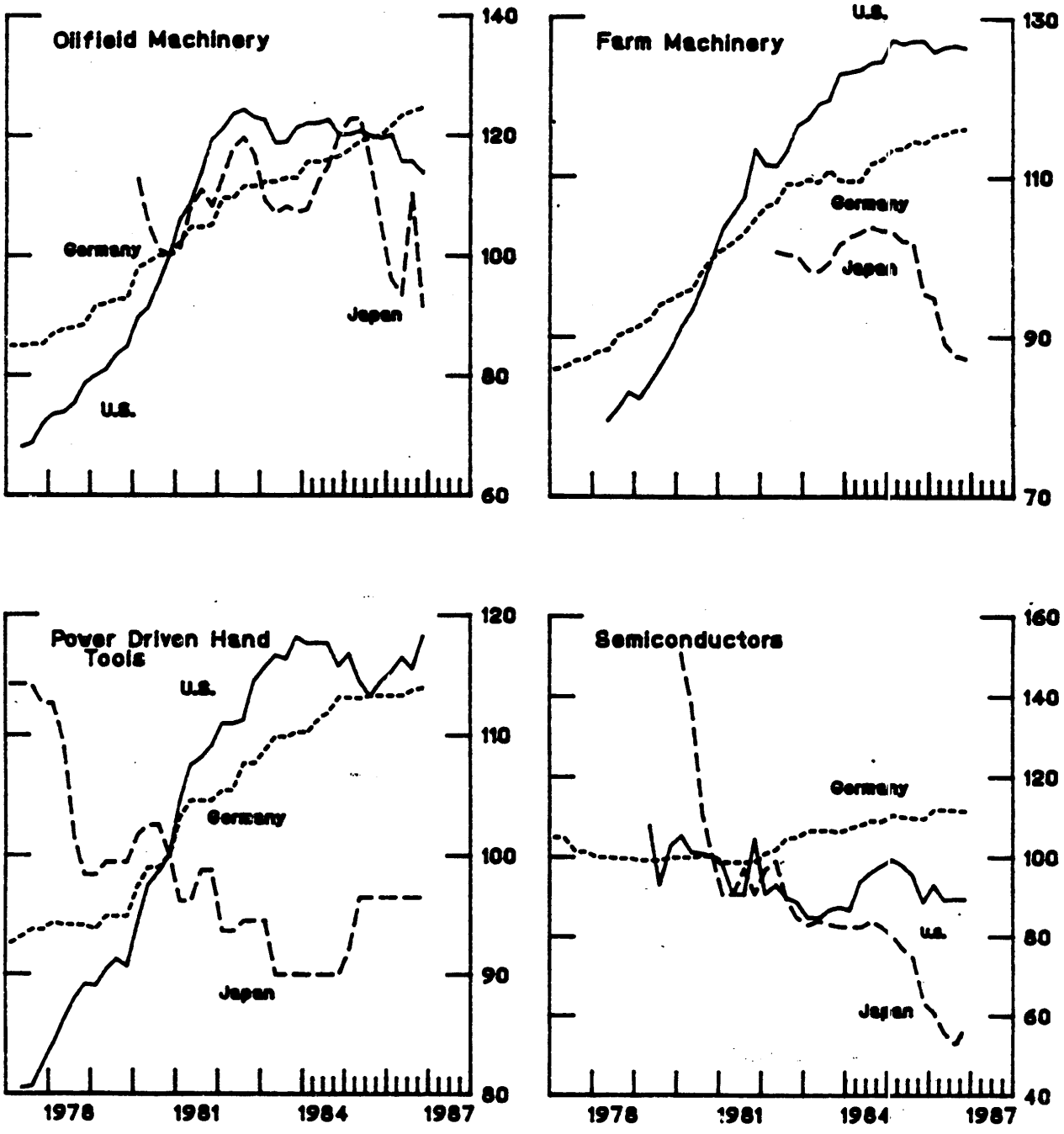
Strategic pricing by existing suppliers or the introduction of new products must be considered in the pricing decision of the U.S. exporter. Chart 16 shows how U.S export prices and German and Japanese export prices in domestic currency terms for similar product categories have moved over the sample period. The chart suggests that in certain products, where the export stake (as measured by export exposure) is high (semiconductors, power tools and oil machinery), U.S. exporters cut prices when their competitors (especially the Japanese) cut prices. Where the stakes are lower (valves and printing machinery), there appears to be less price competition.

In general, export prices of German producers moved more in line with U.S. export prices. When adjusted for the exchange rate change, this suggests that the competitiveness of German exports vis-a-vis U.S.

Chart 16

U.S., German, Japanese Export Prices

(expressed in local currency)
(Index 1980:4 = 100)

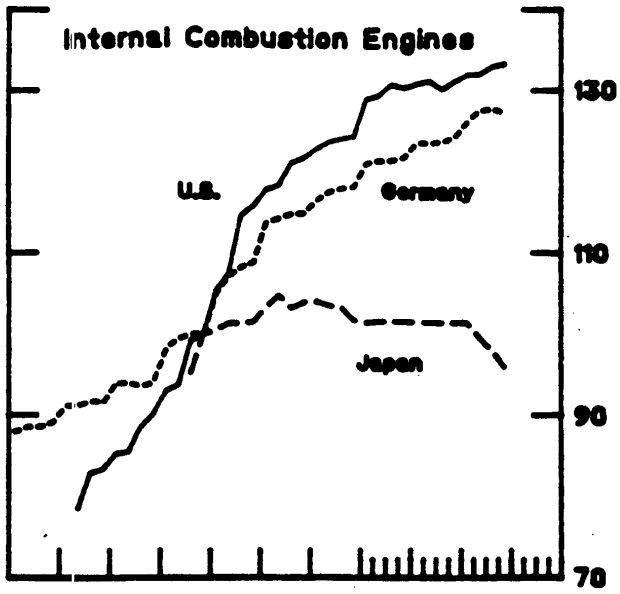


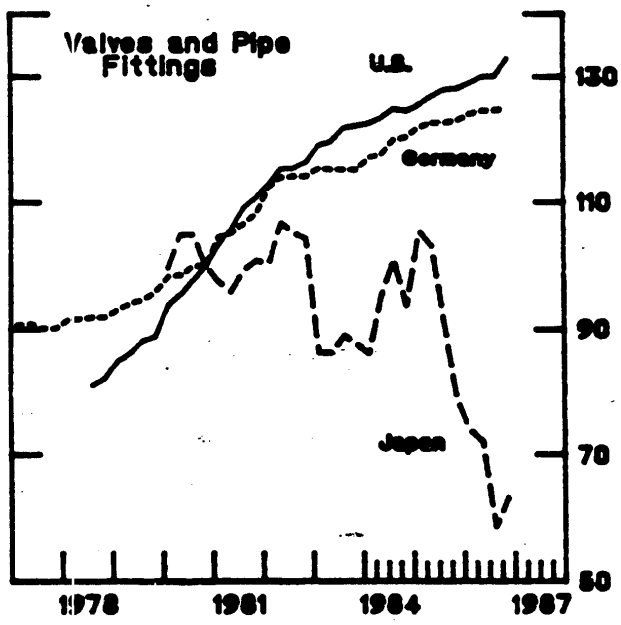
Source: BLS

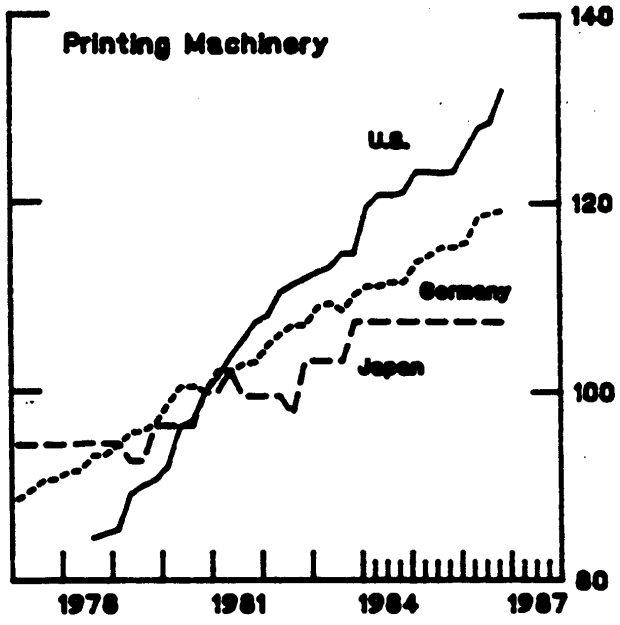
Chart 16 - Continued

U.S., German, Japanese Export Prices: Continued

(expressed in local currency)
(Index 1980:4 = 100)







exports in third markets increased during the dollar appreciation and is declining now. The data for German export prices also suggest somewhat less cutting of profit margins, which is consistent with the aggregate evidence in Chart 10. In part, this behavior stems from the European market focus of German exports -- if we were to create a trade-weighted exchange rate for the Deutsche mark, it would move much less than the bilateral DM-$ rate.

The behavior of Japanese export prices is rather different. Export prices in yen terms have fallen on oilfield machinery, power-driven hand tools, and semiconductors. These are also the industries where U.S. producers' dependence on export sales have grown, and where U.S. producers are pricing more aggressively (Table 18). In other cases, such as printing trades machinery, and internal combustion engines, Japanese price competition appears to be less stiff. Along with low export exposures (Table 19), this may explain the limited attention these U.S. producers apparently pay to the effects of the exchange rate on the price of their products in overseas markets. Overall, this suggests that where the stakes are high and there is competition for market share, U.S. export prices are falling.

The stylized fact that <u>import</u> prices in dollar terms have on the whole remained stable with the profit margin acting as a buffer for changes in the exchange rate, is consistent with the notion that foreign importers are pricing to market in the United States, or are pricing sufficiently below the market to increase market share in the United States. The degree to which pricing-to-market or pricing-below-market strategies are important depends on the degree of heterogeneity of the product and the current status of the product in the market. If the

Table 19

Import Exposure Index[1]
(1980=100)

SIC	Name	1977	1986	Average Annual Change
314	footwear	100.6	444.2	34.4
3531	constr. mach.	79.5	372.2	29.3
231	apparel	99.6	247.2	14.8
2221	textiles	86.7	213.7	12.7
331*	steel	117.3	198.8	9.1
2033	fruits & veg.	91.2	181.4	9.0
2621	pulp mill	96.5	116.1	2.0

*/ Figures are for 1978.
1/ Import volume index divided by industrial production index.

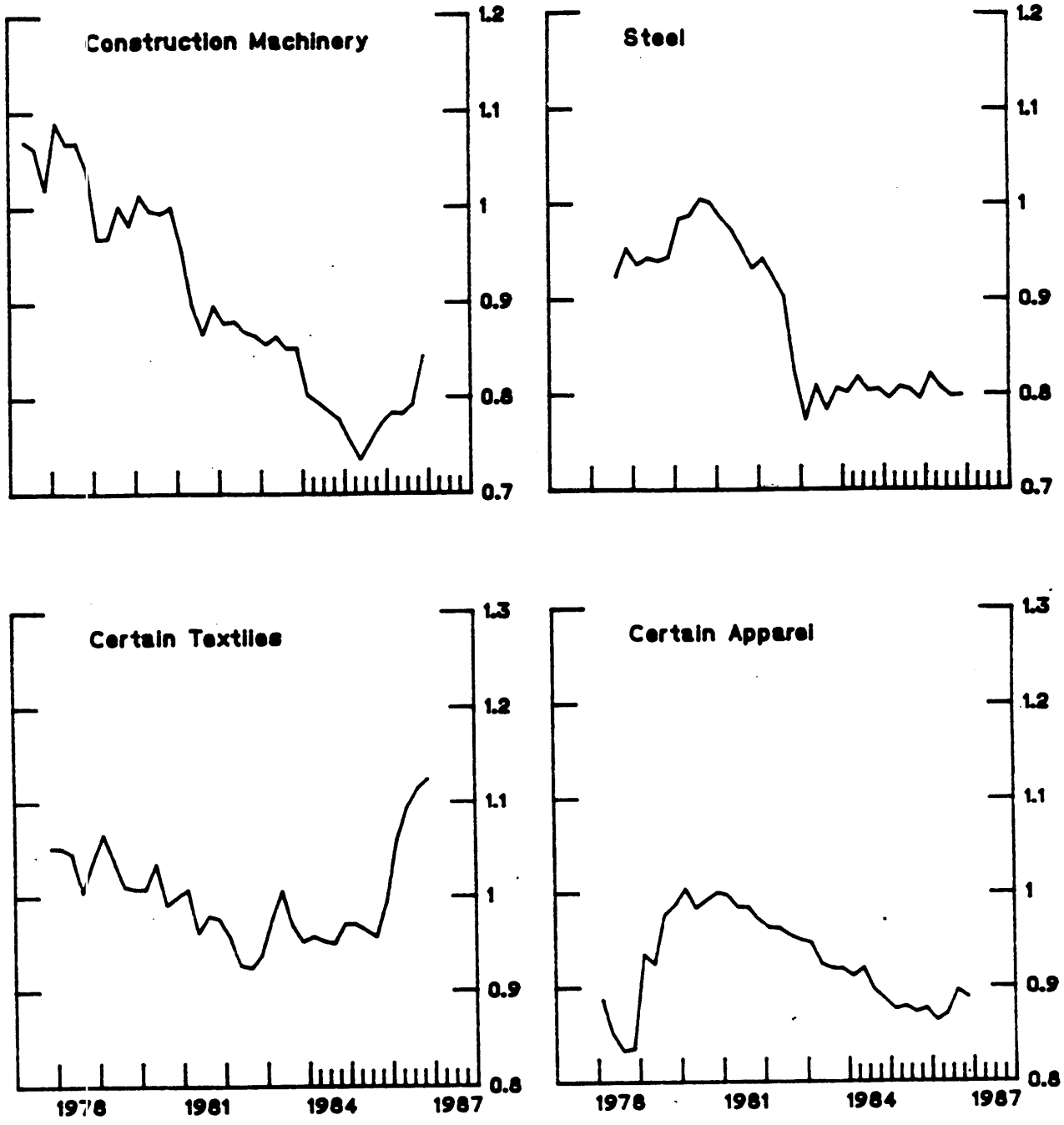
imported product is relatively new to the market and the market is relatively brand-loyal (as might be expected in a market of heterogeneous products) then the importer must price below the market to make inroads today and profits tomorrow. On the other hand, if the import is well established in the marketplace, or is homogeneous, then simply pricing to the market price will be the profit maximizing strategy. In either case, to the extent that foreign suppliers are pricing to market or pricing below market, they are not allowing the change in the exchange rate to pass-through to import prices thereby contributing to the adjustment delay and the persistence of the deficit.

We now consider evidence relating product heterogeneity, foreign pricing strategy, and changes in market shares. Table 19 shows data on the exposure of domestic producers of import competing goods to import volume. The index shown is calculated as the ratio of the index of import volume to the industrial production index, matched by SIC code. Consistent with the widening deficit, all the values for average annual changes are positive; imports have increased market share in virtually all product categories. But, the figures for several of these categories are quite large. If foreign producers are just pricing to market, the share of imports relative to domestic production should be about stable. But, if foreign producers are pricing below the market to increase market share, imports as a share of domestic production would increase.

A good example of a pricing-below-market product is construction machinery. The average annual increase in exposure is quite large and starts from the lowest base among the industries in the sample. Import prices for construction machinery were kept well below the domestic producer price index for the same SIC category (see Chart 17).

Chart 17

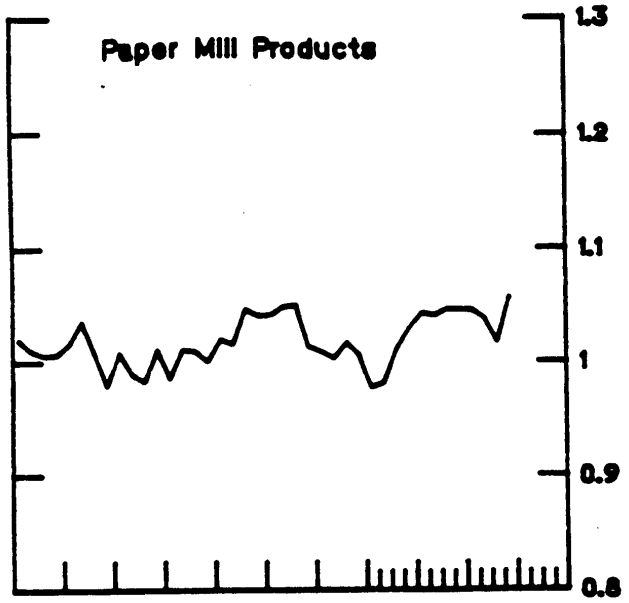
Ratio of BLS Import Prices to Matched U.S. Producer Prices
(Ratio of two series indexed to 1980:4 =100)

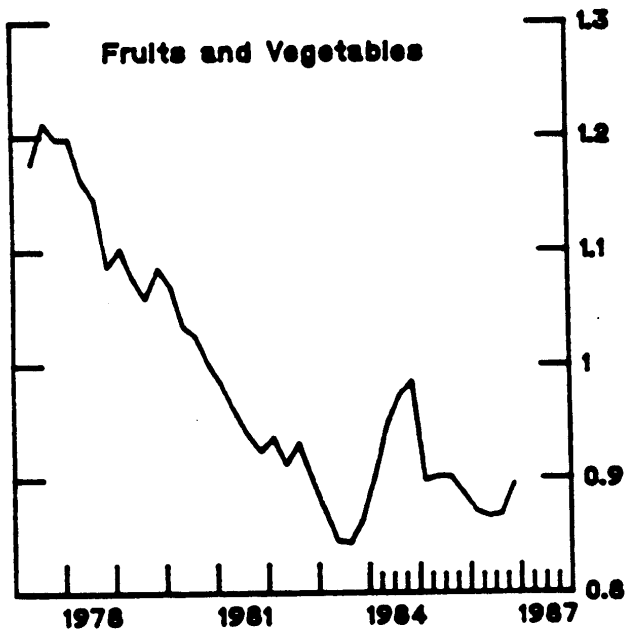


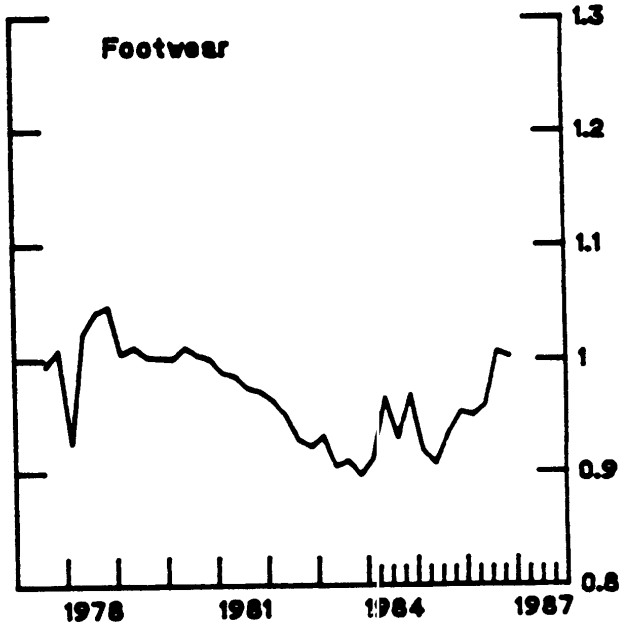
Source: BLS, Department of Commerce: Survey of Current Business.

Chart 17 - Continued

Ratio of BLS Import Prices to Matched U.S. Producer Prices
- Continued -
(Ratio of two series indexed to 1980:4 = 100)







Examples of the pricing-to-market strategy of foreign suppliers are steel and apparel. In these markets, imports prices move relatively more in line with exchange rate changes to keep the ratio between the dollar price of import and the domestic cost proxy more stable (see Chart 17). Moreover, in these three industries, the ratio of import volume to domestic production was greater than 100 percent in 1977 indicating the extent to which imports had already captured the domestic market (Table 19).

To summarize, the degree of product heterogeneity and the competitive characteristics of the marketplace appear to interact to affect the pricing behavior of U.S. and foreign firms. On the export side, the greater the dependence of domestic production on international sales and the greater the degree of international competition, the more U.S. producers apparently incorporate international factors into the pricing strategy. On the import side, foreign suppliers seeking to establish a market in the United States appear to price below market, varying profit margins as necessary to keep dollar import prices well below U.S. producer prices. Foreign importers already established in the U.S. market appear to price to market, with somewhat greater increases in profit margins during the period of dollar appreciation, and reductions in profit margins only sufficient to keep out other foreign competitors. Taken all together, this pricing behavior points to a delay in the adjustment of prices to exchange rate changes, and thus to a persistence in the deficit.

C. Protection

In this subsection, we consider the role trade barriers might have played in the widening and persistence of the deficit. In the past 15 years, both the United States and other countries have increased their use of non-tariff barriers to protect domestic industry. On the export side, trade barriers imposed by other countries and export controls imposed by the United States may have contributed to the widening of the deficit, and led to the persistence of the deficit, by keeping growth of export volume below what would be expected based on historical experience.

On the import side, an increased reliance in the United States on bilateral quantitative restraints has contributed to the creation of world cartels. As U.S. demand increased, this policy allowed some foreign suppliers to keep prices from falling when the dollar was appreciating, and to build-up profit margins that are now being reduced. While there is little evidence to support the view that trade restraints contributed significantly to the initial widening of the deficit, they may well have added to the persistence of the deficit by slowing the process of adjustment to the fall in the dollar. Moreover, bilateral quantitative restraints may continue to bind as the dollar falls, leading import volume to not respond to a change in exchange rates and prices. Trade restraints break the link between international price and exchange rate developments and the value or volume of U.S. imports, contributing to stubbornly high imports and a persistent deficit.[55]

---

55. Consider the effect of a simultaneous change in E, Q, and Y in equation (17).

We examine the role of export barriers first. Since most analyses of trade barriers facing U.S. exporters focus on foreign barriers, the impact of U.S. export controls is perhaps less appreciated. U.S. exporters are subject to extensive licensing and regulation by the U.S. government. Table 20 shows that in 1985, $57 billion of non-military manufactured goods were exported under license; this represents somewhat more than one-quarter of total exports.

Many licenses are valid for more than one year, and products destined for Canada do not require a license. Adjusting for these two factors leaves about $31 billion in exports, or about one-quarter of non-agricultural, non-Canadian destined products, required to apply for a new license in 1985.

Licensing is designed to restrict the availability overseas of non-military, but so-called "dual use", products that could be diverted to military purposes. The Toshiba-Kongsberg case illustrates the complexity of the export control problem -- on the one hand, the government would like to promote exports, on the other hand, it needs to restrict the availability overseas of potentially harmful military technology.

In come cases, such as crude oil, regulations prohibit exports, altogether. A variety of sources suggest that if the United States simply lifted this ban, exports to Japan alone would increase by about $8 billion.

License requirements also act like a tax on U.S. exports reducing the price competitiveness of U.S. producers of high-technology products. While the appreciation of the dollar was undoubtably the most significant "tax" on exports during the first half of the 1980s, as U.S.

Table 20

U.S. Export Licensing

1.	Value of U.S. exports under license (1985)	$57 billion
2.	Share of total U.S. exports under license (1985)	27 percent
3.	Value of U.S. exports applying for new license (1985)*	$31 billion
4.	Share of "licensable" U.S. exports (1985)	24 percent

Memo: Value of total exports, 1985: $213 billion
Value of non-agricultural, non-Canadian exports: $125 billion

*Author's estimate.
Source: National Academy of Sciences, Department of Commerce.

technology advanced, more products were added to the export control list. At the margin, this may have added to the deficit.

The restrictiveness of the licensing process, and the tax implicit in that restriction, depends on a number of factors. In 1985, license processing by the Commerce Department took 54 days on average (it takes 2 days in Japan). Small firms, high-tech products, and Eastern Bloc destinations face longer delays, sometimes up to months or years. Moreover, on average, 7 percent of license applications are returned to the applicant without action because of problems ranging from lack of a signature to incomplete technical information about the product, thus requiring the applicant to resubmit and wait again.[56]

U.S. export controls are also tighter than controls imposed on exports from other allied-western nations. Many U.S. products must be licensed even though similar technology available from foreign suppliers need not be. Moreover, foreign producers using U.S. licensed exports in their products must obtain re-export licenses from the U.S. government before they sell their products abroad -- no other nation requires re-export licensing.

Improvements instituted in 1987 purport to significantly reduce the delay, complexity, and uncertainty associated with the licensing process. But, as U.S. exports expand with the decline in the dollar, the licensing procedure will likely bind more tightly. More firms will apply for licenses to sell new products to new destinations, thus incurring the more burdensome costs of the new license. Export controls act as a tax on a significant fraction of U.S. exports and the burden is greater on

---

56. See National Academy of Sciences (1987).

high-tech products where the U.S. still holds comparative advantage. Thus, to a certain degree export controls offset movements in the exchange rate, contributing to the persistence of the deficit.

Increases in trade barriers overseas may also have contributed, marginally, to the widening of the deficit. Once in place, trade barriers add to the persistence of the deficit. Table 21 shows that U.S. exporters face a world trading environment where non-tariff barriers (NTBs) are increasingly important. Line 1 shows that the value-share of non-fuel exports to industrial markets protected by a broad measure of NTBs increased from 20 percent in 1981 to 23 percent in 1986.[57] The bulk of this increase is accounted for by increased use of quantitative restrictions, most notably on iron and steel.

By destination, NTBs covering exports to developing countries are only slightly higher than those imposed by the industrial country destinations. But, the average tariff rate imposed on imports of the developing countries is about 10 times higher than the 3 percent average tariff rate imposed on imports of the industrial countries. Thus in the case of developing countries tariff barriers may be a significant deterrant to U.S. exports.

None of the previous statistics include barriers like "health, safety, and technical standards", which may be even more important than

---

57. The statistic in the table pertains to all trade between industrial countries. Therefore, U.S. trade barriers are included in these averages. These statistics only measure the presence of non-tariff barriers, not the degree to which they bind. The non-tariff barriers included in these statistics are: measures that control price (variable levies, countervailing duties, administered prices), and volume (quotas, prohibitions, voluntary export restraints), and surveillance of these measures.

Table 21

Exports to Industrial Markets Covered by Non-Tariff Barriers
(percent of value)

Product	Type of Restriction			
	All NTBs		ORS	
	1981	1986	1981	1986
All items, excluding food	19.6	23.1	12.2	14.4
All food	40.8	42.6	27.3	27.4
Ores & metals	12.7	24.7	4.5	16.8
Iron & steel	29.0	64.2	7.8	47.3
Nonferrous	3.8	6.4	0.4	0.4
Chemicals	13.2	12.7	8.1	7.6
Manufactures (non-chemical)	18.6	20.5	11.7	12.2
Electrical machinery	n.a.	12.0*	n.a.	n.a.

* Figure for 1983
Source: UNCTAD TB/B/1126 add.1

quantitative restraints. Quantitative restraints are at least observable policy instruments with less opportunity for so-called "administrative guidance". For example, only 11 percent of Japanese non-fuel imports from industrial countries are covered by the NTBs measured in Table 21. But, "health, safety, and technical standards" are imposed on over 50 percent of Japanese imports from industrial countries.[58]

A greater dependence by foreign nations on non-tariff barriers to protect their domestic markets reduces the effectiveness of the depreciation of the dollar in making U.S. exports competitive and restricts the potential growth in volume of U.S. exports. Moreover, to the extent that the NTBs are relatively more frequently imposed, or are tightened on those products in which the United States has a comparative advantage, U.S. export growth is further hampered, thus contributing to the widening and the persistence of the deficit.

In recent years, the United States too has depended to an increasing degree on bilateral quantitative restraints for the conduct of its trade policy. Chart 18 shows this rise. To the extent that the U.S. market for a product continues to grow, bilateral quotas guarantee a limited set of importers a share of an expanding market. With import supply thus constrained, import prices would likely rise along with increasing demand for the product in the United States, especially if U.S. producers of import-competing products could not (because of production costs) or choose not to (because of short-term profit maximizing strategies) capture the unserved part of the market.

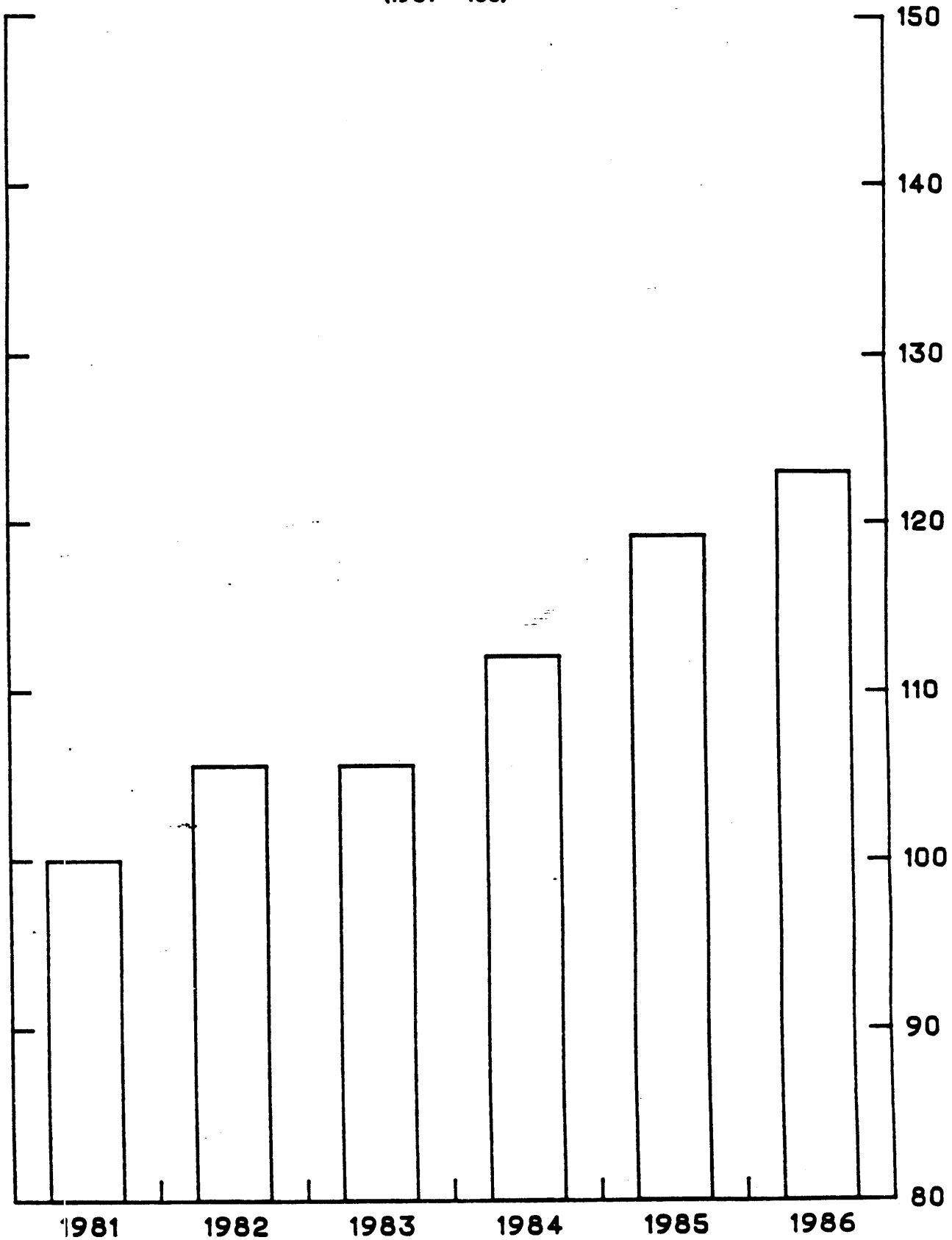
---

57. See UNCTAD (1986).

Chart 18

Index of U.S. Non-oil Imports Covered by Non-tariff Barriers

(1981 = 100)



Source: World Bank, "World Development Report", 1987

There is some evidence that the period of appreciation and the relatively robust U.S. economy, together with quantitative restraints, allowed foreign suppliers to raise foreign currency export prices and fatten margins. At the same time, these factors allowed import prices in dollars to remain below the domestic producer's costs of production, thus preventing the domestic supplier from capturing increases in demand for the product. (See Chart 17.) With profit margins and market share thus built up, the foreign producers are in an excellent position to eat into those margins and keep market share, even as the dollar falls. The bilateral restraints may continue to bind even at quite low levels of the dollar. In both cases, quantitative restraints break the link between exchange rate movements and prices and volumes, preventing adjustment and adding to persistence.

We would expect to see the strongest interaction between a measure of U.S. demand and import prices on those products with the tightest bilateral quotas. Table 22 shows the share of U.S. imports covered by non-tariff barriers by broad product category and source for 1983. First, it is interesting to note that imports from the developing countries are relatively more constrained.[59] By product, textiles have significant non-tariff barriers, reflecting the quotas under the Multi-Fiber Arrangement and other quantitative restraints on textile and apparel trade. The renegotiation of the MFA in 1986 (which broadened and tightened it) as well as tighter bilateral arrangements reached in the

---

59. On the one hand, these countries might benefit from the restraints if they lead to higher prices. On the other hand, resource misallocations and unproductive activities related to the allocation within the developing country of the quota right most likely lead to welfare losses overall.

Table 22

U.S. Imports Covered by Non-Tariff Barriers
(percent of value; 1983)

Imports of	Imports from Industrial Countries	Imports from Developing Economies
All, less fuels	16.6	18.9
Agriculture	23.5	25.1
Manufacturers	16.5	18.6
Textiles	31.1	64.0
Footwear	0.0	16.7
Iron & steel	35.6	48.9
Electrical machinery	5.2	5.3
Vehicles	34.7	0.0
Rest of manufactures	6.4	5.4

Source: Nogues, Olechowski, and Winters.

latter part of 1986 with Japan, Korea, Taiwan, and Hong Kong suggests that the figure in the Table understates the share of textiles and apparel that is covered by NTBs. Steel restraints were quite high already in 1983, but were tightened further in 1985 with the bilateral voluntary restraints covering 18 major supplying countries. Restraints on footwear are rather high also.

Table 23 shows changes in the prices and values of steel mill products and consumer textile products over recent periods. Despite the sharp fall in the dollar, prices of both categories rose only moderately during 1986. In the first half of 1987, however, these prices accelerated sharply. As can be inferred from the similarity of value and price changes for steel, the volume of steel imports has remained fairly flat over this period. Given that capacity utilization in the domestic industry was rising sharply in the first half of 1987, the import restraints would appear to have been binding.[60] The continued rise in the volume of imports of textiles and apparel suggests that the import restraints are somewhat less binding overall than in the case of steel. Nevertheless, the sharp rise in the prices of textile and apparel products undoubtedly reflects the tightening of NTBs in the second half of 1986 and the fact that U.S. textile mills were running at very high utilization rates in the first half of 1987.[61]

Another approach to the question of the effect of NTBs on import prices is to more explicitly model the inverse demand curve for imports.

---

60. The Federal Reserve's index of capacity utilization in the steel industry rose from 62% in 1986:4 to 73% in July 1987.
61. The Federal Reserve's index of capacity utilization for textile mill products reached 97% in 1987:2; unfilled orders were also rising sharply.

Table 23

Changes in Imports of Steel Mill Products and Consumer Textiles

	Percent Changes (AR)	
	1986Q4 / 1985Q4	1987Q2 / 1986Q4
Textile and Apparel		
Import Value	18.5	25.7
Import Price	2.3	16.0
Steel Mill Products		
Import Value	5.4	11.3
Import Price	4.1	10.0

Essentially we would like to model equation (17) more explicitly. Table 24 outlines a simple regression of import prices in dollars against the source-weighted product-specific exchange rate, the source-weighted product-specific foreign cost of production, and a disaggregated component of real U.S. expenditure. We expect a positive correlation between foreign costs and import prices, and a negative correlation between changes in the exchange rate (as defined here). If restraints are important, with no offsetting increase in supply from the domestic market, there should be a positive sign on the demand term.

Table 25 shows the results. It appears that for shoes, textiles, and steel, the hypothesis is borne out: import prices in dollar terms are positively affected by foreign currency costs of production, negatively affected by movements in the dollar, and positively affected by U.S. real expenditure on the broad product group appropriate to the specific import. On the other hand, for construction machinery, import prices are affected by costs of production and the exchange rate. In the absence of barriers to entry, an increase in U.S. real business fixed investment leads to an incipient rise in price, which attracts new supply and keeps prices from rising..[62] Despite the Multi-Fiber Arrangement, apparel prices do not appear to react to demand pressures.[63] The World Bank has described the MFA as "porous", suggesting that there is enough variation in the product and in suppliers

---

62. The strong negative sign in the domestic expenditure variable suggests that importers price-below-market to gain a hold of an expanding market.
63. Note however, that the material in Table 23, which shows a substantial increase in textile import prices, with much less change in import volume, sugggests that the new MFA and the bilateral agreements are binding.

Table 24

Basic Functional Form of Regression

$$\log(\text{dollar import price}) = a_0 + a_1 \log(\text{source-weighted nominal exchange rate}) + a_2 \log(\text{source-weighted industry-specific foreign wholesale price index}) + a_3 \log(\text{real expenditure-broad product group}).$$

Selected Disaggregations of U.S. Expenditure

Real Personal Consumption Expenditure

- Consumer Durables
- Consumer Non-Durables
  - Clothing and Shoes (used for 314, 222, 231)
  - Foods and Beverages (tried on 2033)

Real Business Fixed Investment (used for 3531)
(tried for 262)

- Structures
  - Residential
  - Non-residential (used for 33)
- Plant and Durable Equipment, Non-Residential

Table 25

Regressions for Industry-Specific Import Prices
(T-statistics in parentheses)

Sic	Name	foreign costs 1/	source-weighted nominal exch. rate	real expenditure broad product group	$\bar{R}^2$	Rho	DW
314	footwear	0.170797 (2.56675)	-0.182013 (2.56062)	0.371729 (1.77464)*	.224	.80	X
222	textiles	0.359349 (2.09563)	-0.279614 (2.88496)	0.417937 (2.65659)	.627	.62	X
331	steel	1.55485 (5.35644)	-0.017625 (0.418374)	0.300111 (2.49286)	.567	1.0	X
231	apparel	0.410084 (1.95866)	-0.055316 (-1.35055)	-0.314462 (-1.44265)	.222	1.0	X
3531	construction machinery	0.591566 (10.4882)	-0.278898 (4.85328)	-0.319724 (-7.2494)	.860	X	1.5
				Industry specific U.S. producer price			
262	pulpmill	0.009167 (0.227527)	0.096071 (0.842444)	1.01313 (11.357)	.946	.54	X
2033	fruits & veg.	0.133882 (2.89641)	-0.141845 (-2.8572)	1.322798 (2.48106)	.353	.67	X

*/ Two lags.
1/ Source-weighted industry-specific foreign producer price index.

that bilateral quantitative restraints in fact do not restrain imports much at all.

Pulp mill products and fruits and vegetables appear to follow pricing-to-market strategies. The primary determinant of pulp mill import prices is the cost of production of the domestic substitute. In the case of fruits and vegetables, foreign costs, exchange rate, and U.S. domestic prices are determinants of the import prices.

One final note on the pricing equations. In several cases, surprisingly little of the variation in import prices can be attributed to movements in costs, the exchange rate, or demand. It appears the import prices for footwear, apparel, and fruits and vegetables, are close to being a random walk. What might be causing movements in these import prices that is neither a cost nor a demand effect is unclear.

D. Microeconomic Factors: Summary

In this section we have examined industry-specific behavior of import and export prices, as well as changes in protectionist policies, and related these factors to the widening and persistence of the U.S. external deficit. On the import side, the deficit may have continued to widen somewhat, and is surely persisting, as a result of the pricing behavior of foreign suppliers, at least in a number of key areas. Import prices have risen slowly relative to the decline in the dollar, in part because foreign exporters have been willing to sustain significant reductions in profit margins, at least temporarily, and in part because production costs have been falling abroad. For some commodity categories, import price stability has reflected little change in the real exchange rates of some major supplying countries; in others, prices

have risen not because of dollar depreciation but because of quantitative restrictions.

The ability of foreign exporters to price to the U.S. market is related in some cases to the geographic pattern of exchange rate changes, in other cases to the particular characteristics of the products, and in still other cases to quantitative restraints on U.S. imports that tend to reduce the degree of competition in the marketplace. Suppliers in some key U.S. trading partner countries have not yet had to contend with significant appreciation of their currencies. Where products are quite homogeneous, it appears that foreign exporters price to market, changing foreign currency prices and margins sufficiently to keep the dollar price of imports competitive. On the other hand, where quantitative restraints are most prevalent, the relationships between exchange rate movements and the price and quantity of imported products have been particularly tenuous. To the extent that foreign profit margins adjust to exchange rate changes and demand conditions, import prices do not adjust. And, to the extent that quotas remain binding as the dollar falls, import volumes will not fall even as import prices rise, so long as the quantity constraints bind. Overall, this behavior delays the adjustment process, leading in the short run to persistence of the deficit by stretching out the J-curve.

On the export side, U.S. producers appear to be taking a more strategic view towards developments in international markets than has been the case historically. Where exports have become an important part of domestic production, U.S. exporters are taking into account price competition from other foreign suppliers in third markets, and are trimming their prices. In addition, exporters are maintaining lower

export prices for products destined primarily for markets where the U.S. has gained little in competitiveness because of only small movements in the dollar. Subdued price increases on exports in the short run will keep export value down, thus contributing to persistence in the nominal deficit. The failure of exports volumes to expand rapidly enough to begin to reduce the nominal deficit, especially given these signs of more aggressive pricing by U.S. firms, must rest with lags, quality, or trade restraints.

It is difficult to argue that changes in trade barriers had more than a marginal impact on the widening of the deficit. However, they may well have contributed more significantly to its persistence. Increasing quantitative restrictions on imports at home and abroad undoubtedly have slowed the process of adjustment of real net exports to gains in U.S. price competitiveness. And U.S. export restrictions may well have inhibited export growth to some degree, particularly in high tech areas.

VIII. Conclusions

Our empirical analysis suggests that the widening of the U.S. external deficit between 1980 and 1986 can be accounted for by macroeconomic factors. At one level of analysis, the excess of growth in both domestic expenditures and GNP in the United States, relative to that in the rest of the world, accounts for a little over one-third of the deficit. The decline in U.S. international price competitiveness associated with the rise in the dollar through early 1985 accounts for most of the rest of the deficit. At a more fundamental level, drawing on the accumulated (and averaged) wisdom of a group of global macroeconomic

models, roughly two-thirds of the external balance effects of these changes in relative growth and real exchange rates can be explained by the mix of fiscal expansion and monetary tightening in the United States, along with fiscal contraction in other major industrial countries during this period. We attribute the rest of the widening of the deficit to the unexplained rise in the dollar during 1984, to debt problems in developing countries, and to policies at home and abroad that have depressed U.S. agricultural exports.

While macroeconomic analysis can account for the initial widening of the deficit, it cannot fully explain the persistence of the deficit two and a half years after the peak in the dollar. As of the third quarter of 1987, import prices were clearly rising less rapidly than historical experience suggested they should be, and exports, though expanding briskly, were doing so at a pace that fell short of conventional model predictions. Our assessment of available microeconomic evidence suggests that changes in the pricing behavior of foreign exporters, and the gradual spread of protectionist measures at home and abroad, were contributing significantly to this persistence. Foreign exporters on average, and of a number of products in particular, were reducing their profit margins. They were also benefiting from a reduction in costs associated with the appreciation of their currencies. Moreover, quantitative trade restrictions may well have slowed the adjustment of trade volumes to changes in relative prices.

What implications do we draw from these results for possible solutions to the deficit problem? First, some of the factors underlying the persistence of the deficit are likely to be transitory, and significant further adjustment is probably in train. However, we suspect

that a substantial deficit would remain even after full adjustment to the level of exchange rates prevailing in the third quarter of 1987 has taken place. In the absence of a significant adjustment of relative growth rates, the continuation of a sizable deficit seems likely, in view of: (1) the persistence of the growth gap that emerged over the first half of the 1980s, (2) the decline in the U.S. net foreign asset position (and related fall in net investment income receipts), (3) the fact that the dollar in the third quarter of 1987 was still above its 1980 level in real terms, and (4) the apparent willingness of foreign suppliers to squeeze their profits for a sustained period.

The closing of the U.S. current account deficit will require a significant reduction in the growth of U.S. domestic spending relative to that abroad, and probably a further decline in the dollar at some point. Our analysis of recent history suggests that a policy scenario to achieve this outcome probably would have to include a U.S. fiscal contraction, accompanied by a temporary easing of monetary policy (to keep GNP growth from falling unduly), and a fiscal expansion abroad. This mix of policies would close the growth gap, reduce U.S. real interest rates relative to those abroad, and lead to some further downward adjustment in the dollar. In addition, the difficulties evident in the adjustment process that can be traced to trade barriers, suggest that any progress that can be made in the current Uruguay Round of trade talks to roll back quantitative restrictions on world trade, would be highly desirable.

Bibliography

Baldwin, Richard. "Empirical Evidence on Hystereisis in Trade," Presented at the NBER Summer Institute, "International Issues/Real Side," July 1987.

Baldwin, Richard and Paul Krugman. "Persistent Trade Effects of Large Exchange Rate Shocks," NBER Working Paper 2017, Cambridge: National Bureau of Economic Research, January 1986.

Bergsten, C. Fred and William R. Cline. The U.S.-Japan Economic Problem. Washington: Institute for International Economics, October 1985.

_____ and John Williamson. "Exchange Rates and Trade Policy," in William R. Cline, ed., Trade Policy in the 1980s. Cambridge: MIT Press, 1983.

Bergstrand, Jeffrey H. "U.S.-Japan Trade: Predictions Using Selected Economic Models," Federal Reserve Bank of Boston New England Economic Review, May-June 1986.

_____. "The U.S. Trade Deficit: A Perspective from Selected Bilateral Trade Models," Federal Reserve Bank of Boston New England Economic Review, May-June 1987.

Berner, Richard. "The Structural Problem in U.S. Trade and the Likely Policy Response," Salomon Brothers Bond Market Research, April 10, 1987.

Blanchard, Olivier J. and Lawrence Summers. "Perspectives on High World Interest Rates," Brookings Papers on Economic Activity, vol 2, 1984.

Branson, Richard, Arminio Fraga, and Robert A. Johnson. "Expected Fiscal Policy and the Recession of 1982," International Finance Discussion Paper 272. Washington: Board of Governors of the Federal Reserve System, 1985.

Bryant, Ralph C. and Gerald Holtham. "The U.S. External Deficit: Diagnosis, Prognosis, and Cure," Brookings Discussion Papers in International Economics 55. Washington: Brookings Institution, March 1987.

_____, Dale W. Henderson, Gerald Holtham, Peter Hooper and Steven Symansky, eds., Empirical Macroeconomics for Interdependent Economies, (forthcoming) Washington, D. C.: Brookings Institution, 1988.

_____, Gerald Holtham and Peter Hooper, External Deficits and the Dollar: The Pit and the Pendulum, (forthcomming) Washington,D.C.: Brookings Institution, 1987.

Christelow, Dorothy. "Japan's Intangible Barriers to Trade in Manufactures," Federal Reserve Bank of New York Quarterly Review, vol. 10 no. 4,.(Winter 1985-86).

Clarida, Richard. "Current Account, Exchange Rates, and Monetary Dynamics in a Stochastics Equilibrium Model," Cowles Foundation Discussion Paper 694. New Haven: Yale University, date??

Danker, Deborah J., Richard D. Haas, Dale W. Henderson, Steven Symansky and Ralph Tryon. "Small Empirical Models of Exchange Market Intervention: Applications to Germany, Japan and Canada, "Board of Governors of the Federal Reserve System: Staff Study No. 155, April 1985.

Darby, Michael R. "The Current Account Deficit, Capital Account Surplus, and National Investment and Savings," U.S. Department of the Treasury, May 1987.

_____, Robert Gillingham, and John S. Greenlees. "The Impact of Government Deficits on Personal and National Savings Rates," U.S. Treasury Research Paper 8702. Washington: U.S. Treasury, 1987 (?).

Dornbusch, Rudiger. "Exchange Rates and Prices," American Economic Review, March 1987.

_____. Open Economy Macroeconomics. New York: Basic Book Publishers, Inc., 1980.

_____ and Stanley Fischer. "The Exchange Rate and the Current Account," American Economic Review, vol 70 (December 1980).

Feldstein, Martin. "The Budget Deficit and the Dollar," NBER Working Paper 1898. Cambridge: National Bureau of Economic Research, April 1986a.

_____. "Correcting the World Trade Imbalance," Cambridge, December 1986b.

Frankel, Jeffrey. "In Search of the Exchange Risk Premium: A Six-Currency Test Assuming Mean-Variance Optimization," Journal of International Money and Finance, 1: 1982.

_____. "Ambiguous Macroeconomic Policy Multipliers in Theory and in Empirical Models," in Ralph Bryant et al, eds. Empirical Macroeconomics for Interdependent Economies, Washington, D.C.: Brookings Institution 1988.

_____ and K. Froot. "The Dollar as an Irrational Speculative Bubble: A Tale of Fundamentalists and Chartists," NBER Working Paper, #1854, March 1986.

Frenkel, Jacob A. and Assaf Razin, "The Mundell-Flemming Model: A Quarter Century Later," Washington, D.C.: IMF Working Paper 87/46, July, 2 1987.

Friedman, Edward and Allen Sinai. "The Dollar and the Financial Markets," Prepared for the 62nd Annual Conference of the Western Economic Association, July 9, 1987.

Gylfason, and Risager. "Does Devaluation Improve the Current Account?," European Economic Review, June 1984.

Haynes, Stephen E., Michael M. Hutchinson, and Raymond R. Mikesell. "Japanese Financial Policies and the U.S. Trade Deficit," Essays in International Finance 162. Princeton: International Finance Section, April 1986a.

_____, _____, and _____, "U.S.-Japan Bilateral Trade and the Yen-Dollar Exchange Rate: An Empirical Analysis," Southern Economic Journal, April 1986b.

Helkie, William H. and Peter Hooper. "The U.S. External Deficit in the 1980s: An Empirical Analysis," International Finance Discussion Paper 304. Washington: Board of Governors of the Federal Reserve System, February 1987. (Forthcomming in Bryant, Holtham and Hooper, eds External Deficits and the Dollar: The Pit and the Pendulum. Washington, D.C.: Brookings Inst., 1987.)

_____ and Lois Stekler. "Modeling Investment Income and Other Services in the U.S. International Transactions Accounts," (forthcoming) Federal Reserve Board, 1987.

Hooper, Peter. "The Dollar, External Imbalance, and the U.S. Economy," Presented at Western Economics Association, July 1987.

_____. "International Repercussions of the U.S. Budget Deficit," Brookings Discussion Papers in International Economics 27. Washington: Brookings Institution, February 1985.

Hufbauer, Gary Clyde and Howard F. Rosen. Trade Policy for Troubled Industries. Washington: Institute for International Economics, March 1986.

Hutchinson, Michael and Charles Piggot. "Budget Deficits, Exchange Rates, and the Current Account: Theory and U.S. Evidence," Federal Reserve Bank of San Francisco Review, Fall 1984.

Johnson, Robert A. "Anticipated Fiscal Contraction: The Economic Consequences of the Announcement of Gramm-Rudman-Hollings," International Finance Discussion Paper 291. Washington: Board of Governors of the Federal Reserve System, 1986.

Kaempfer, William H. and Thomas D. Willet. "Why an Import Surcharge Wouldn't Help America's Trade Deficit," World Economy, vol. 10 no. 1, (March 1984).

Krugman, Paul. "Long Run Effects of the Strong Dollar," in Richard Marston, ed., Exchange Rate Misalignment and International Competitiveness. NBER Conference Report, May 1987.

_____. "Sustainability and the Decline of the Dollar," Brookings Discussion Papers on International Economics. #57, March 1987.

_____. "Pricing-to-Market When the Exchange Rate Changes," mimeo,

Massachusetts Institute of Technology, January 1986.

_____ and Richard Baldwin. "The Persistence of the U.S. Trade Deficit," Brookings Papers on Economic Activity, vol. 1 (1987).

_____ and George N. Hatsopoulos. "The Problem of U.S. Competitiveness in Manufacturing," Federal Reserve Bank of Boston New England Economic Review, January-February 1987.

Laney, Leroy O. "The Strong Dollar, the Current Account, and Federal Deficits: Cause and Effect," Federal Reserve Bank of Dallas Review, January 1984.

Laursen, Stephen and Lawrence Metzler. "Flexible Exchange Rates and the Theory of Employment," Review of Economics and Statistics, vol. 32 (1950).

Leamer, Edward E. and Robert M. Stern, Quantitative International Economics, Allyn and Bacon, 1970

Liederman, Leonardo and Mario I. Blejer. "Modeling and Testing Ricardian Equivalence: A Survey," IMF Working Paper WP/87/35, April 29, 1987.

Loopesko, Bonnie E. and Robert A. Johnson, "Realignment of the Yen-Dollar Exchange Rate: Aspects of the Adjustment Process in Japan," International Finance Discussion Paper 311. Washington D.C.: Board of Governors of the Federal Reserve System, August, 1987.

Mann, Catherine L. "Employment and Capacity Utilization in Import Sensitive U.S. Industries", in PhD Thesis Trade and Finance Relations Between the Industrial and Developing Countries. MIT, 1984.

_____. "Prices, Profit Margins, and Exchange Rates," Federal Reserve Bulletin, June 1986.

_____. "Prices, Profit Margins, and Exchange Rates: After the Fall." Presented at the NBER Summer Institute, "International Issues/Real Side," July 1987.

Marquez, Jaime R. "The Global Repercussions of Reducing the U.S. Trade Deficit: An Econometric Analysis," Federal Reserve Board (unpublished), 1987.

Marris, Stephen, Deficits and the Dollar: the World Economy at Risk, Washington D.C.: Institute for International Economics, December, 1985.

Marston, Richard C. "Real Exchange Rates and Productivity Growth in the United States and Japan," NBER Working Paper 1922. Cambridge: National Bureau of Economic Research, May 1986.

Masson, Paul and Adrian Blundell-Wignall. "Fiscal Policy and the Exchange Rate in the Big Seven: Transmission of U.S. Government Spending Shocks," European Economic Review, vol. 28, 1985.

McKinnon, Ronald I. "Money Supply versus Exchange Rate Targeting in Open Economies," mimeo, Stanford University, June 1987.

_____ and Kenichi Ohno. "Getting the Exchange Rate Right: Insular verus Open Economies," paper presented at the American Economic Association, December, 1986.

_____ and _____. "Purchasing Power Parity as a Monetary Standard," mimeo, Stanford University, August 1987.

Mishkin, F.S. "U.S. Macroeconomic Policy and Performance in the 1980s: An Overview," NBER Working Paper, #1929, May 1986.

Mundell, Robert A. "A New Deal on Exchange Rates," paper presented at Japan-United States Symposium on Exchange Rates and Macroeconomics, Tokyo Japan, January 1987.

National Academy of Sciences. Balancing the National Interest U.S. National Security Export Controls and Global Economic Competition. Washington: National Academy Press, 1987.

Nogues, Julio, Andrez Olechowski, and L. Alan Winters, "The Structure of Non-Tariff Barriers Facing the Exports of the Industrial Countries," World Bank Staff Working Paper, 1986.

Obstfeld, Maurice. "Floating Exchange Rates: Experience and Prospects," Brookings Papers on Economic Activity, vol. 2, 1985.

Pauls, B. Dianne. "Measuring the Foreign-Exchange Value of the Dollar," Federal Reserve Bulletin, June 1987.

Persson, Torsen and Lars Svensson. "Current Account Dynamics and the Terms of Trade: Harberger-Laursen-Metzler Two Generations Later," Journal of Political Economy, February 1985.

Reinhart, Vince. "Macroeconomic Influences on U.S.-Japan Trade Imbalances," Federal Reserve Bank of New York Quarterly Review, Spring 1986.

Richardson, Peter. "Tracking the U.S. External Deficit: 1980-1985: Experience with the OECD Interlink Model," OECD Working Paper 38. OECD, February 1987.

Sachs, Jeffrey D. "The Dollar and the Policy Mix: 1985," Brookings Papers on Economic Activity, vol. 1, 1985.

_____ and Noriel Rubini. "Sources of Macroeconomic Imbalances in the World Economy: A Simulation Approach," Prepared for the Third International Conference sponsored by the Institute for Monetary and Economic Studies of the Bank of Japan, June 1987.

Saxonhouse, Gary R. "The Micro- and Macro-economics of Foreign Sales to Japan," in William R. Cline, ed., Trade Policy in the 1980s. Cambridge: MIT Press, 1983.

_____. "Japan's Intractable Trade Surpluses in a New Era," World

Economy, vol. 9, no.3, (September 1986).

Shafer, Jeffrey R., and Bonnie E. Loopesko. "Floating Exchange Rates After Ten Years," Brookings Papers on Economic Activity, 1:1983.

Thomas, Charles. "U.S. International Transactions in 1986," Federal Reserve Bulletin, May, 1987.

Thompson, Robert L. "Agriculture in the Uruguay Round." Presented at NBER Summer Institute, August 14, 1987.

Tucker, Stuart K. "Reforming U.S. Agricultural Trade Policy," Policy Focus 2. Washington: Overseas Development Council, 1987.

Turner, Philip and Jean-Pierre Tuveri, "Some Effects of Export Restraints on Foreign Trading Behavior," OECD Economic Studies 2, Spring 1984.

UNCTAD, "Problems of Protectionism and Structural Adjustment," TD/B/1039 Part I, TD/B/1126 Add.1, TD/B/940, 1983, 1986.

Woo, Wing T. "Exchange Rates and the Prices of Non-food, Non-Fuel Products," Brookings Papers on Economic Activity, vol. 2, 1984.

World Bank. World Development Report, Washington: World Bank, 1987.

International Finance Discussion Papers

IFDP NUMBER	TITLES	AUTHOR(s)
	1987	
316	The U.S. External Deficit: Its Causes and Persistence	Peter Hooper Catherine L. Mann
315	Debt Conversions: Economic Issues for Heavily Indebted Developing Countries	Lewis S. Alexander
314	Exchange Rate Regimes and Macroeconomic Stabilization in a Developing Country	David H. Howard
313	Monetary Policy in Taiwan, China	Robert F. Emery
312	The Pricing of Forward Exchange Rates	Ross Levine
311	Realignment of the Yen-Dollar Exchange Rate: Aspects of the Adjustment Process in Japan	Bonnie E. Loopesko Robert E. Johnson
310	The Effect of Multilateral Trade Clearinghouses on the Demand for International Reserves	Ellen E. Meade
309	Protection and Retaliation: Changing the Rules of the Game	Catherine L. Mann
308	International Duopoly with Tariffs	Eric O'N. Fisher Charles A. Wilson
307	A Simple Simulation Model of International Bank Lending	Henry S. Terrell Robert S. Dohner
306	A Reassessment of Measures of the Dollar's Effective Exchange Value	B. Dianne Pauls William L. Helkie
305	Macroeconomic Instability of the Less Developed Country Economy when Bank Credit is Rationed	David F. Spigelman
304	The U.S. External Deficit in the 1980s: An Empirical Analysis	William L. Helkie Peter Hooper
303	An Analogue Model of Phase-Averaging Procedures	Julia Campos Neil R. Ericsson David F. Hendry

---

Please address requests for copies to International Finance Discussion Papers, Division of International Finance, Stop 24, Board of Governors of the Federal Reserve System, Washington, D.C. 20551.

International Finance Discussion Papers

IFDP NUMBER	TITLES	AUTHOR(s)
302	A Model of Exchange Rate Pass-Through	Eric O'N. Fisher
301	The Out-of-Sample Forecasting Performance of Exchange Rate Models When Coefficients are Allowed to Change	Garry J. Schinasi P.A.V.B. Swamy
300	Financial Concentration and Development: An Empirical Analysis of the Venezuelan Case	Jaime Marquez Janice Shack-Marquez
299	Deposit Insurance Assessments on Deposits at Foreign Branches of U.S. Banks	Jeffrey C. Marquardt
	1986	
298	The International Debt Situation	Edwin M. Truman
297	The Cost Competitiveness of the Europaper Market	Rodney H. Mills
296	Germany and the European Disease	John Davis Patrick Minford
295	The United States International Asset and Liability Position: A Comparison of Flow of Funds and Commerce Department	Guido E. van der Ven John E. Wilson
294	An International Arbitrage Pricing Model with PPP Deviations	Ross Levine
293	The Structure and Properties of the FRB Multicountry Model	Hali J. Edison Jaime R. Marquez Ralph W. Tryon
292	Short-term and Long-term Expectations of the Yen/Dollar Exchange Rate: Evidence from Survey Data	Jeffrey A. Frankel Kenneth A. Froot
291	Anticipated Fiscal Contraction: The Economic Consequences of the Announcement of Gramm-Rudman-Hollings	Robert A. Johnson
290	Tests of the Foreign Exchange Risk Premium Using the Expected Second Moments Implied by Option Pricing	Richard K. Lyons
239	Deposit Risk Pooling, Irreversible Investment, and Financial Intermediation	Robert A. Johnson
238	The Yen-Dollar Relationship: A Recent Historical Perspective	Manuel H. Johnson Bonnie E. Loopesko