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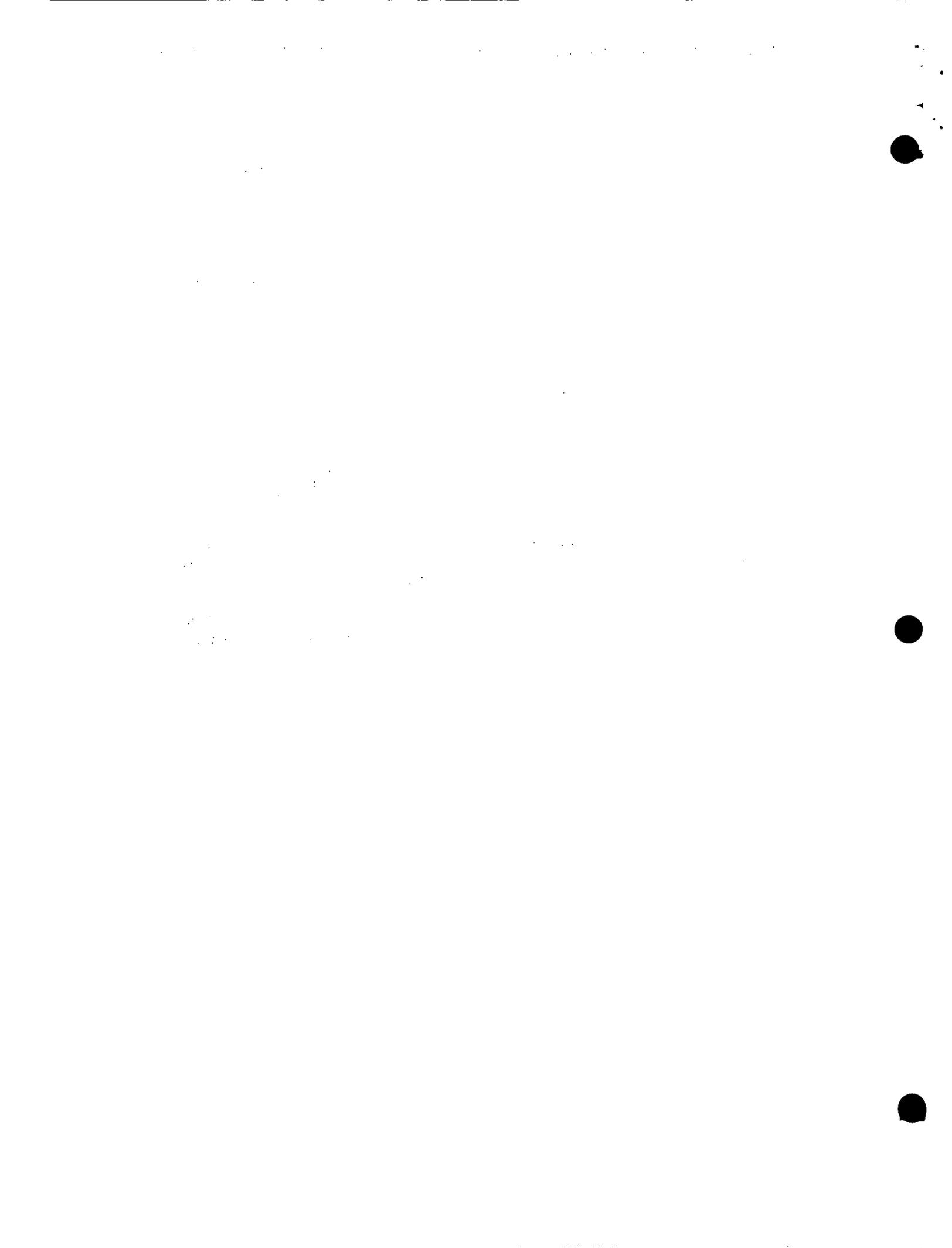
Subject: Issues in the Assessment of Exchange Rates of Industrial Countries in the Context of Their Economic Policies

The attached paper on issues in the assessment of exchange rates of industrial countries in the context of their economic policies is scheduled for a seminar discussion on Monday, January 23, 1984.

If Executive Directors have technical or factual questions relating to this paper prior to the seminar discussion, they should contact Mr. Artus, ext. (5)7676.

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INTERNATIONAL MONETARY FUND

Issues in the Assessment of Exchange Rates of Industrial
Countries in the Context of Their Economic Policies

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December 23, 1983

<u>Contents</u>	<u>Page</u>
I. Introduction	1
II. General Observations on Exchange Rate Determination	5
III. Price Competitiveness	9
1. Basic assumptions of the competitiveness analysis	11
2. Some measures of competitiveness used by the Fund staff	15
3. Reliability of the normalized unit labor cost indicator	17
4. Note on consumer price indicators	23
5. Summary	25
IV. Underlying Payments Balances	25
1. Procedures for assessing a country's underlying external payments position	27
2. Illustrative calculation of the underlying current account position	29
3. Assessing the sustainability of the underlying current account position	32
4. Reliability of estimates of underlying payments balances and sustainable exchange rates	35
5. Summary	41
V. Concluding Remarks	43



I. Introduction

On the occasion of the 1983 annual review of the implementation of surveillance, the staff indicated its intention of bringing papers to the Executive Board concerning the difficult problem of how to identify cases where the behavior of the exchange rate should be viewed with concern from a national or an international standpoint because it is unrelated to underlying economic and financial conditions. ^{1/} It was also noted that the proposed papers would give renewed attention to the assessment of balance of payments developments in a medium-term framework, from the perspective of individual members as well as in a multilateral setting.

The present paper is concerned with these surveillance issues as they pertain to industrial countries, both those that have independently floating exchange rates and those that operate under other exchange arrangements. ^{2/} Specifically, the purpose of the paper is: (1) to review the considerations that are important in determining whether an exchange rate deviates substantially from its sustainable level; (2) to assess the degree of confidence that can be attached to judgments of the sustainable exchange rate; and (3) to draw relevant policy implications from the standpoint of Fund surveillance. These issues have been discussed extensively in the past, and it is not the purpose of this paper to introduce new concepts. Rather, the intention is to survey the techniques that are typically employed by the staff and to provide an analysis of their practical usefulness.

^{1/} "Annual Review of the Implementation of Surveillance," (SM/83/43, 3/1/83), pp. 2-3. In this sentence, and hereafter, the term exchange rate is used as an abbreviation for the effective exchange rate, except where explicit reference is made to bilateral rates.

^{2/} Among the twenty members of the Fund that are classified as industrial countries, four broad categories of exchange arrangements are currently in use. The currencies of four of the major industrial countries (Canada, Japan, the United States, and the United Kingdom) are floating independently. Eight European countries (Belgium, Denmark, France, the Federal Republic of Germany, Ireland, Italy, Luxembourg, and the Netherlands) operate within the cooperative exchange arrangements of the European Monetary System. Four other European countries (Austria, Finland, Norway, and Sweden) peg their exchange rates to a composite basket of currencies. Finally, there are four countries (Australia, Iceland, New Zealand, and Spain) that are classified by the Fund as operating a system of "more flexible" exchange arrangements.

In this paper, the term sustainable is given its traditional broad meaning: an exchange rate is viewed as being sustainable if it can be maintained over the medium term and is "appropriate" from the standpoint of the country in question and the international community as a whole. It is important to employ this rather broad definition of sustainability because experience suggests that a wide range of exchange rate levels could be maintained for an extended period by, for example, undue restrictions on trade and payments, severe restraint of aggregate domestic demand, or massive external borrowing. Such conditions might cause the level and structure of domestic output and employment in both the country in question and also--if the country was relatively large--in its trading partners to deviate substantially from those that would be appropriate from the viewpoint of an efficient international allocation of resources.

Several aspects of the concept of a sustainable exchange rate merit emphasis. First, it is the rate that is consistent with a viable medium-term pattern for the overall balance of payments, including the current and capital accounts, and an adequate but not excessive rate of accumulation of net official foreign exchange reserves. In particular, it should reflect not only the competitive position of the country in the international market for goods and services, but also its propensity to be a net importer or exporter of capital. Second, a country's sustainable exchange rate cannot be determined in isolation from developments abroad, particularly among its major trading and financial partners. For example, the level of the exchange rate that is sustainable depends on the overall stance of policies both at home and abroad. Third, as long as inflation rates and other underlying economic conditions continue to differ among countries, the sustainable level of each country's nominal exchange rate may change over time. It is only for purposes of simplification that this paper refers to a sustainable level of the exchange rate, rather than a sustainable time path.

It is often a difficult matter to judge whether an exchange rate that can be maintained over the medium term is also the appropriate rate. This question touches on some very broad issues of economic policy. For example, if a country adopts a fiscal policy that leads to a persistently higher level of its fiscal deficit, it may experience a rise in its domestic interest rate and--if the expected inflation rate does not increase--an appreciation of its exchange rate, leading to a current account deficit financed by larger inflows of interest-sensitive capital. Such a pattern may be a source of concern for the international community; in practice, however, the issue of whether a given change in fiscal policy goes beyond the bounds of acceptability from the international standpoint is obviously a matter of judgment. A second example is the case of a country that makes active use of policy measures to

depreciate its exchange rate in order to mitigate the adverse effects of cyclical developments abroad on its domestic output and employment. Here again, it is clearly not an easy matter to differentiate between an appropriate response and one that goes beyond a mere attempt to insulate the domestic economy from adverse economic developments abroad.

The Fund is continuously faced by the need to reach judgments on whether countries' exchange rates are sustainable, or whether they might potentially give rise to undesirable balance of payments developments and, at a later stage, to sharp and costly exchange rate movements. In particular, these issues are at the heart of the Fund's obligations under Article IV Section 3(b) of the Amended Articles of Agreement, and the implementing decision on surveillance over exchange rates (Decision No. 5392-(77/63), adopted 4/29/77). In the case of a member country that pegs its currency or one that participates in a cooperative exchange arrangement the authorities are obliged to notify the Fund promptly of any changes in their exchange arrangements, and the Fund is required to assess the appropriateness of the new rate. Furthermore, whatever exchange rate regime a country operates, the Fund is charged with the responsibility of appraising the behavior of the exchange rate and, particularly, of identifying "behavior of the exchange rate that appears to be unrelated to underlying economic and financial conditions, including factors affecting competitiveness and long-term capital movements," ^{1/} in order to ensure that exchange market developments are consistent with the country's obligations under the Articles of Agreement. The Fund's responsibilities arise essentially in a multilateral context; thus the Fund's judgment of a member's exchange rate must be consistent with its assessment of the set of exchange rates that can be maintained and is appropriate among its members. This consistency aspect is a crucial element of Fund surveillance.

Fund-supported programs often involve specific exchange rate understandings, and Article IV consultations normally encompass the issue of the appropriateness of the exchange rate. A judgment that the existing exchange rate is unsustainable does not automatically imply a precise view of what the sustainable rate is. For example, heavy and persistent intervention may lead to a judgment that the rate should be changed, though providing little guidance on what the new rate should be. In the context of surveillance, however, it is seldom sufficient to advance the view that the current level of the exchange rate is unsatisfactory without giving any indication as to what would constitute a satisfactory range. Such judgments must be made with due regard to both the inherent

^{1/} "Surveillance over Exchange Rates," Decision No. 5392-(77/63).

uncertainties that exist in the determination of a sustainable exchange rate and the nature of the present international monetary system, which permits a substantial degree of exchange rate flexibility.

The staff's approach to the problem of assessing the sustainable exchange rate makes use of various elements. A number of indicators, particularly measures of international cost and price competitiveness, have been developed and used as an integral part of the analysis that forms the basis of the staff appraisal in Article IV consultations, and, more recently, as part of the experimental system of information notices on major changes in real exchange rates. It has always been recognized, however, that there are important limitations to a judgment based exclusively on considerations of international competitiveness. In particular, such a judgment does not take into account the likely effects of recent policy changes or developments affecting the underlying capital account position of the balance of payments. Thus, throughout the 1970s, the staff carried out research to develop and apply a more comprehensive approach that could be used to estimate the underlying external payments positions of industrial countries. These estimates were incorporated in successive World Economic Outlook papers and various reports to the Executive Board. The work done at the multilateral level was interrupted in 1980 as the increase in oil prices and divergences in monetary and real sector conditions among industrial countries made it excessively difficult to estimate their underlying payments positions. More recently, the staff has also carried out research on the short-run determinants of floating exchange rates, including interest rate differentials and international portfolio shifts, in order to attain a better understanding of the factors that can lead actual market exchange rates to deviate from their sustainable levels.

Section II of this paper surveys some general aspects of exchange rate determination among industrial countries, emphasizing particularly the role of capital mobility and developments in financial markets, and their implications for exchange rate overshooting. Section III discusses the use of information on international price competitiveness in the assessment of the sustainability of a country's exchange rate. Section IV broadens the discussion to the underlying payments balance approach, which takes account of a number of important considerations in addition to price competitiveness, thereby providing more comprehensive and internationally-consistent judgments about the set of exchange rates that would be appropriate for industrial countries. Finally, Section V provides some concluding comments.

II. General Observations on Exchange Rate Determination

Experience of currency movements in industrial countries that have floating exchange rates, diversified financial markets and relatively unrestricted capital mobility suggests that many types of development can cause the exchange rate to deviate from the level that would be sustainable in the medium term on the basis of underlying economic and financial conditions. These considerations are reflected in the recent Report of the Working Group on Exchange Market Intervention, prepared by representatives of the seven major industrial countries, which states:

The authorities in all the Summit countries have intervened at times as part of their response to situations in which exchange rates were judged to have diverged markedly from what appeared to be warranted on the basis of fundamental economic factors. This is often loosely described as "overshooting." ^{1/}

Aside from occasional bandwagon effects, overshooting results mainly from the fact that adjustments in goods and labor markets take much longer than those that operate in the financial markets. When there is a shock such as an unanticipated change in monetary policy, interest rates in financial markets tend to overshoot in the short run so as to offset the protracted nature of adjustments in the goods and labor markets, and this can lead to overshooting of the exchange rate. Such overshooting effects can be both large and persistent. In particular, an unanticipated tightening of monetary policy may be accompanied by a marked increase in interest rates, even though such a policy change can reasonably be assumed to lead to a decline in the expected rate of inflation. In turn, this development can lead to a marked rise in the nominal (and real) exchange rate, especially if the higher level of interest rates is expected to persist for some time.

Overshooting may also result from the limited information available to private market participants. For example, market participants may have only limited information on the policy strategy of the authorities, or they may misjudge the likelihood of its implementation because, in the past, the authorities have failed to carry out their announced strategy. Market participants may also find it difficult to interpret current account developments. In particular, they may have difficulty in distinguishing between changes in the current account that result

^{1/} Report of the Working Group on Exchange Market Intervention, p. 30.

from persistent factors and those that merely reflect temporary or cyclical developments. In some cases, they may also fail to take full account of the price effects that are already in the 'pipeline' as a result of past changes in exchange rates. Overshooting effects related to current account developments may be amplified by limited substitutability among financial assets denominated in different currencies; for example, a country having a current account deficit for cyclical reasons may see its exchange rate depreciate significantly if market participants require a large expected rate of return to induce them to assume the risk of investing in financial assets denominated in that country's currency.

To the extent that the magnitude of overshooting could be related to specific factors such as temporary changes in interest rate differentials and current account balances, one could assess the sustainable level of a country's exchange rate by focusing the analysis on these factors. The main problem with this approach is that overshooting is largely the result of developments that were not previously anticipated by market participants, and it is difficult to reach a judgment as to what the expectations of market participants were in the past and why they have changed.

There are many cases, however, where an analysis of the factors leading to exchange rate overshooting provides a useful supplement to assessments of the sustainability of the exchange rate based on the elements that are discussed in the next two sections of this paper; namely, those that emphasize considerations of international competitiveness and of the underlying balance of payments position. In particular, when these other considerations suggest that the market exchange rate deviates substantially from the level that would be sustainable in the medium term, a careful analysis of developments in financial markets can provide an independent confirmation of this conclusion, as well as insights into the possible sources of the deviation.

An example of both the usefulness and the limitations of factors that may induce overshooting is the 1981 staff study on "International Aspects of Policies of Monetary Restraint" (SM/81/210, 11/2/81). The study concluded that overshooting associated with developments in financial markets might have contributed in a significant way to the exchange rate experience of the United States from the autumn of 1975 to the end of 1981, as well as to that of the Federal Republic of Germany and Switzerland in 1973-75, Japan in 1974-77, and the United Kingdom in 1979-80. ^{1/}

^{1/} The discussion is contained in Section III of SM/81/210, pp. 18-28.

A general impression of the detailed analysis contained in SM/81/210 may be obtained from Chart 1, which presents quarterly data on real effective exchange rates, current account positions and a measure of real interest rate differentials ^{1/} for the United States, the Federal Republic of Germany, Japan, and the United Kingdom during various periods. In the case of the United States, for example, the sharp rise in the real effective exchange rate (solid line) from the third quarter of 1980 followed a strong improvement in the current account position that had begun in 1978, and was undoubtedly associated with the very large contemporaneous rise in the real interest rate differential favoring U.S. dollar-denominated financial assets (dotted line). However, the U.S. dollar continued to strengthen in real effective terms during 1981 and most of 1982, even though the real interest rate differential stabilized and the current account position of the United States (dashed line) deteriorated sharply during this period.

In the case of the Federal Republic of Germany, both the sharp rise in the real value of the deutsche mark in 1973 and the subsequent depreciation in 1975 were associated with movements of the current account and the real interest differential favoring deutsche mark assets in the same direction. On the other hand, the deutsche mark rose in real terms from the end of 1975 to the end of 1976, despite the fact that the current account balance of the Federal Republic of Germany and the real yield differentials in its favor were stable or declining.

Movements in the real exchange rate of the Japanese yen from 1976 to 1979 provide an illustration of the mutually-reinforcing effects of interest rate and current account movements. There was a large improvement in Japan's current account from late 1976 until the end of 1977, and an equally sharp deterioration in 1978-79. In addition, the real interest differential in favor of Japan was generally on a rising trend until the second quarter of 1978, after which it began to decline. These developments were associated with a large swing in the real effective exchange rate of the yen whose timing closely paralleled actual current account developments with a lag of one or two quarters. From the fourth quarter of 1976 to its peak level in 1978, the yen rose by nearly 30 per cent in real effective terms before depreciating by an even larger amount from the third quarter of 1978 to the end of 1979.

^{1/} The proxy for expected inflation is a weighted average of the rate of increase of the domestic demand deflator in the current quarter and the next two quarters. Staff projections of this deflator are used for the end-of-period observations.

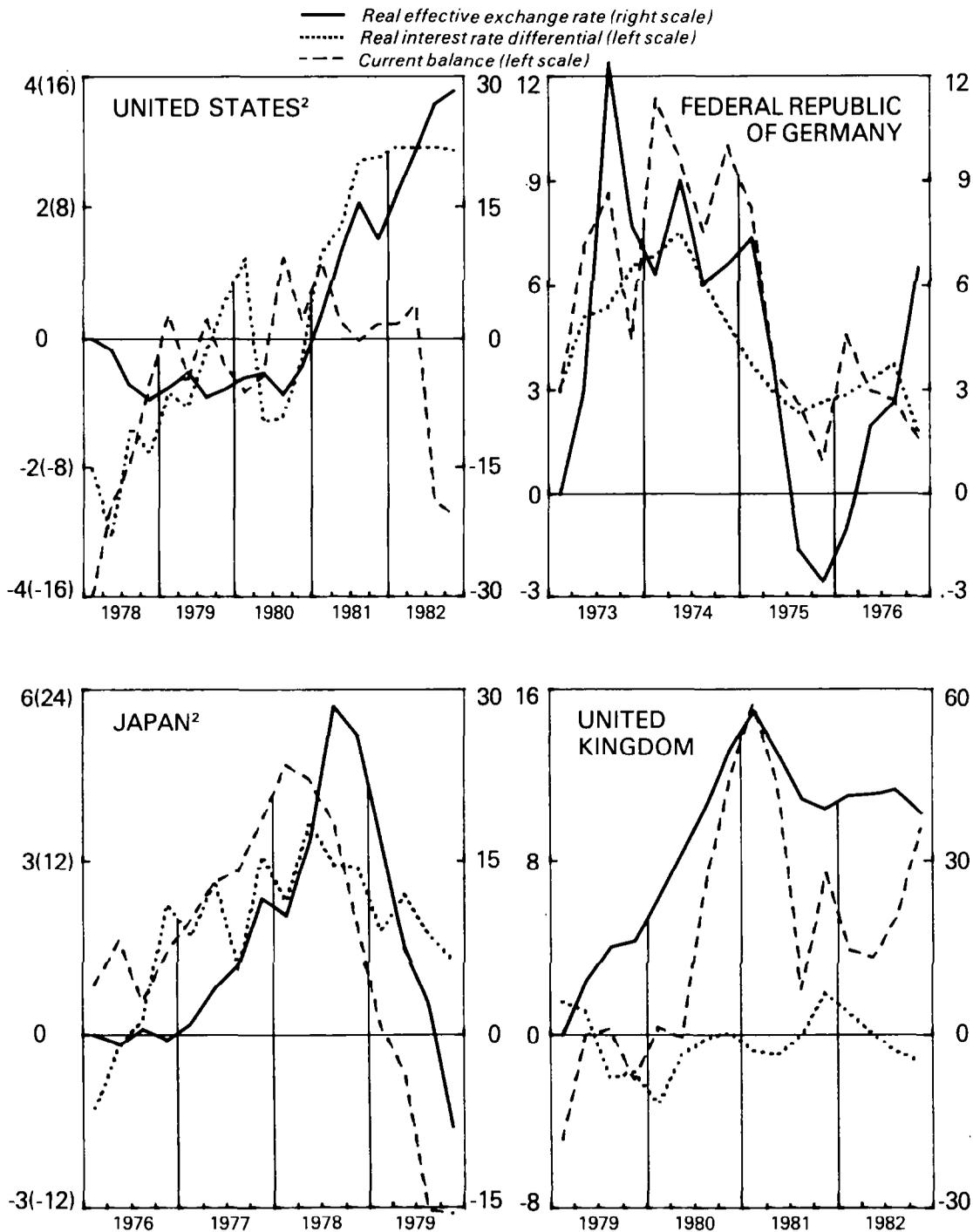
The pound sterling appreciated sharply in real effective terms during 1979-80. At its peak in early 1981 it was 56 per cent above the level of the first quarter of 1979, and it remained nearly 40 per cent above the Q1 1979 level throughout 1982. In contrast to the case of Japan, the real appreciation of sterling preceded the improvement in the current account of the United Kingdom. Thus the data in Chart 1 appear to suggest that sterling's appreciation in 1979-80 was associated with anticipations of a substantial improvement in the current account position owing to the exploitation of North Sea oil, a development which became evident in the actual current account data from the middle of 1980. In addition, the pronounced move to monetary restraint in the United Kingdom in 1980 eliminated the real interest differential against the pound and created a significant differential favoring sterling assets towards the end of 1981.

On the basis of these cases, it is clear that the attempt to assess the impact of short-term financial effects is complicated by a number of factors. For example, the real interest rates perceived by market participants are not clearly observable even after the fact: it is quite likely that the particular measure of the real interest rate that has been used in Chart 1 fails to reflect the level of real interest rates perceived by market participants, at least during particular periods.

More broadly, although there appears to be a fairly direct association between the large movements in real effective exchange rates in the four cases cited above and the changes in real interest rate differentials and current account balances, it is less clear what portion of each exchange rate movement represented overshooting in response to temporary financial market developments, and how much was due to expected real sector developments that would imply a permanent shift in the sustainable level of the real exchange rate. While this problem is present to some degree in all of the examples cited, it is perhaps most evident for sterling. During the period under consideration, the real effective exchange rate for the pound was affected both by a major real sector development (the advent of North Sea oil) and by an important program of monetary restraint. Both factors tended to appreciate the real effective exchange rate in the short run; but whereas the effects of North Sea oil production were of a permanent nature, those of the monetary squeeze would normally be expected to be temporary and reversible in the longer term. The analysis of short-run financial developments gives little indication of what portion of the overall movement in the real effective exchange rate for sterling should be attributed to the permanent improvement in the underlying payments position associated with North Sea oil and how much to temporary financial effects. Similar comments apply to the other cases.

CHART 1

SELECTED INDUSTRIAL COUNTRIES:
 REAL EFFECTIVE EXCHANGE RATES,
 REAL INTEREST RATE DIFFERENTIALS,
 AND CURRENT ACCOUNT BALANCES¹



¹Real effective exchange rates are normalized unit labor costs adjusted for exchange rate changes and are expressed as deviations from the level in the first period covered by the chart. Real interest rate differentials are real long-term interest rates in each country minus an average of the real long-term rates in the other four largest industrial countries. In the weighting scheme, each country has the same weight, except for the United States which is given a weight twice as large as the weight of each of the other countries. Current balances include official transfers and are expressed as a percentage of exports of goods and services.

²For the United States and Japan, the basic left-hand scale refers to the real interest rate differential, while the scale in parentheses refers to the current account data.



In summary, although it is necessary to recognize the importance of capital movements for exchange rate determination in the short run, it is not feasible to arrive at a judgment of the level of a floating exchange rate that would be sustainable in the medium term solely by analyzing the effects of current and prospective changes in interest rates and other temporary disturbances affecting the current account balance. Such a judgment must be based largely on an analysis of more fundamental factors.

III. Price Competitiveness

Perhaps the element that is most commonly taken into account in attempting to assess whether a country's exchange rate is at an appropriate level is its price competitiveness. Such an assessment normally takes the form of a straightforward comparison of past movements in prices at home and abroad, after adjustment for exchange rate changes. If the comparison indicates that the country considered has experienced significant losses or gains in its price competitiveness in relation to a base period when its position was considered adequate, this finding is viewed as establishing a presumption that the current exchange rate is unsustainable. 1/ Sustainability can, of course, be restored through a change in the nominal exchange rate, a change in the level of domestic currency prices relative to those abroad, or some combination of the two. In many cases, a comparison of movements in production costs is made as a supplement, or an alternative, to a comparison of movements in prices. Indicators of relative prices or costs adjusted for exchange rate changes are here referred to as "real exchange rates."

Article IV consultation reports normally include a discussion of the relevant country's international competitiveness, and this discussion is one of the bases for the section of the staff appraisal that deals with the exchange rate. A number of special exchange rate studies have also made use of such comparisons. 2/ In addition, following the review of surveillance procedures in March 1983, the Executive Board decided to initiate, on an experimental basis, a system whereby the Executive

1/ Instead of analyzing changes in aggregate price indices relative to a base period, a more direct method of assessment would be to compare the prices of specific goods and services in the home market with those prevailing abroad, after expressing both in a common currency. However, the necessary data are not normally available for a sufficiently large number of commodities.

2/ See, for example, the Staff Report for the 1982 Special Consultation Under Article IV with Sweden (EBS/82/222, 12/3/82).

Board would be notified regularly of all large changes in real effective exchange rates. Under this new procedure, the staff recently issued the first information notices (EBS/83/138, 7/6/83) and the first paper containing a review of changes in real effective exchange rates (EBS/83/139, 7/7/83).

Outside the Fund, national authorities in virtually all industrial countries also pay close attention to various indicators of their price competitiveness. For example, the recent report on intervention states that:

"While a comparison of inflation rates--even in the longer run--requires considerable judgment regarding the choice of appropriate price indices and the base period, members agreed that it was a useful concept for assessing the exchange rate." 1/

In general, however, conclusions obtained from the application of this method are only considered as tentative. For example, on the occasion of the adoption of the experimental notification procedure, an Executive Director stressed that indicators of competitiveness could be useful to sound an alert but, because such indicators can be quite distorted, they should not per se create alarm. This point received broad support from other Executive Directors.

Given the dearth of other suitable indicators, however, considerable practical importance is often attached to the results of analyses of international competitiveness. Comprehensive exchange rate studies, after considering a number of elements such as the evolution of the balance of payments and the overall policy strategies of the countries concerned, frequently conclude with an appraisal that is closely in line with the results of the competitiveness analysis. The reason for this emphasis is twofold. First, there is a widely-held view that in the longer-term there is a close relation between a country's exchange rate and relative price levels at home and abroad. Second, as discussed in Section IV of this paper, there is considerable uncertainty concerning the relation between the exchange rate and movements in variables other than relative prices.

This section outlines the major assumptions that underlie the use of indicators of international competitiveness for the assessment of exchange rates and then describes the main statistical measures of competitiveness that are employed by the staff. The reliability of the

1/ Report of Working Group on Exchange Market Intervention, p. 31.

preferred indicator, that based on relative normalized unit labor costs in manufacturing, is then considered in detail. After a comment on competitiveness indicators based on consumer prices, the main conclusions of the section are briefly summarized.

1. Basic assumptions of the competitiveness analysis

The use of indicators of international price competitiveness to assess the exchange rate is an application of the relative purchasing power parity (PPP) theory of exchange rates. Without entering into the intricacies of the various versions of this theory, it is important to note that it deals with currency relationships where: (1) countries produce similar goods and there are no major impediments to free trade, (2) adjustment lags in the goods markets are considerable because of information lags and other market inefficiencies, and (3) countries' overall price levels in local currency tend to be determined primarily by domestic factors.

The first assumption is necessary in order for exchange rates to tend toward their PPP level in the longer run. If countries produced completely different goods, or if there were major impediments to free trade, there would be little or no tendency--even in the longer run--for countries' price levels to converge when converted into the same numeraire currency. The second assumption is required in order for the view that PPP holds in the long run to be consistent with short-run divergences between national price levels; if goods market prices adjusted immediately there would be no need for the analysis of trends in competitiveness, since nominal exchange rates would continuously move to offset inflation rate differentials. The third assumption is necessary in order for the analysis to be relevant to the assessment of the exchange rate, rather than relative overall price levels in local currencies.

The empirical relevance of the second assumption concerning the existence of adjustment lags is widely accepted, since there is ample evidence that buyers in the international goods market do not immediately change their sources of supply in response to month-to-month (or even year-to-year) changes in relative prices. More basic issues arise in judging the empirical relevance of the first and third assumptions. On the whole, even though there is room for concern about restrictions that impede free trade in goods and services, industrial countries tend to maintain a fairly liberal trade system with relatively low tariffs, at least as far as nonagricultural products are concerned. There is much evidence, however, that the assumption that countries produce similar goods--that is goods that are close substitutes in demand--does not

fit well with conditions in the real world. In particular, there are many goods and services whose use is country-specific. For example, there is obviously little arbitrage between prices of newly-produced houses in the United States and in France, or between books in French and in English. Many types of services, including both government services and those provided by the private sector, are also country specific.

It is possible to exclude most of these "nontradable" goods from comparisons of international price levels, but this only reduces the problem. For example, if a country's tradable goods prices remain in line with those of similar goods in the world market, it will not experience a decline in domestic and foreign demands for these goods. However, if the ratio of nontradable goods prices to tradable goods prices increases, it may still experience a shift in domestic production from the tradable sector to the nontradable sector. Thus, an analysis that focuses on the relative prices of tradable goods among countries--without taking into account the relative prices of tradable and nontradable goods within each country--may at times be misleading because it ignores a major determinant of the sustainable exchange rate.

The degree of specialization in various categories of tradable goods also varies across countries. Indeed, specialization along the lines of comparative advantage is the basic characteristic of free international trade. To illustrate this point, the structure of production of the manufacturing sector--the dominant segment of the tradable-goods producing sector in industrial countries--is presented in Table 1 for the three largest industrial countries and for three smaller countries. The table indicates significant cross-country differences in the proportion of total value-added that is contributed by the various industries. It is also relevant to note that evidence at the industry level, such as that given in Table 1, does not reflect the full extent of structural differences because much specialization occurs at the level of individual products, rather than across broad industrial categories. Furthermore, even in cases where the degree of specialization at the individual product level is similar in different countries, the specific types of commodities produced may still be greatly differentiated on account of differences in quality, delivery dates, after-sales service, and many other characteristics.

These observations are not intended to detract from the role played by relative prices in a country's foreign trade performance. Nevertheless, they do suggest that the PPP theory has to be qualified in two respects. First, no matter how much care is taken in the choice of the price indices, the resulting indicator of competitiveness may still fail

Table 1. Selected Countries: Shares of Value Added in Manufacturing ^{1/}

	United States	Fed. Rep. of Germany	Japan	Italy	Belgium	Sweden
Food, beverages, and tobacco	13.1	9.5	10.5	9.3	15.4	10.6
Textiles, weaving, apparel, and leather	7.4	6.7	6.7	15.1	11.4	7.0
Wood and wood products	12.7	10.5	10.1	11.0	9.6	22.2
Chemicals, and rubber products	11.1	13.0	9.7	11.6	9.8	7.8
Petroleum refining	2.5	0.5	4.7	1.2	6.9	0.8
Non-metallic minerals	3.7	5.0	4.2	6.7	7.1	4.8
Iron and steel	5.3	4.5	3.9	4.9	9.3	5.2
Non-ferrous metals	2.1	0.8	1.6	1.1	2.6	1.0
Metal Products	6.6	11.6	6.4	7.2	7.6	3.6
Non-electrical machinery	8.6	12.3	11.7	8.3	6.6	17.8
Electrical machinery	11.1	11.2	10.5	6.6	5.4	6.8
Precision instruments	2.5	3.4	1.8	2.4	1.6	1.2
Road vehicles	7.4	5.7	6.0	4.8	3.9	7.2
Aircraft	2.9	0.3	--	1.2	0.9	0.3
Ships	1.6	1.2	4.1	1.4	0.9	2.9
Miscellaneous	1.6	3.8	3.1	1.2	0.9	0.6

Source: The input-output tables used were published by the statistical office of the European Communities or, in the case of non-EEC countries, by national statistical offices. The years of the tables are 1972 for the United States, 1975 for the Federal Republic of Germany, 1970 for Japan, 1975 for Italy, 1970 for Belgium, and 1968 for Sweden.

^{1/} Because the level of disaggregation of the input-output tables varies across countries, not all categories of manufactures were available on a consistent basis for all countries. For some countries, the disaggregation of metals into ferrous and non-ferrous, of machinery into electrical, non-electrical, and precision instruments, and of transport equipment into road vehicles, aircraft, and ships was estimated by the staff.

to measure the true level of competitiveness because of composition effects; that is, because the weights given to the various items in the price indices differ significantly across countries. This problem may be quite significant because rates of growth of productivity and, therefore, rates of change of prices, differ substantially among sectors. For example, a country may appear to be gaining competitiveness on the basis of aggregate price indices when in fact the relative change in the indices may be caused by the country's heavy specialization in an industry that has a relatively high rate of productivity growth and a declining price trend when compared with other industries. Thus, whenever possible, a study of competitiveness should include an examination of whether the results are likely to be influenced by composition effects.

Second, the PPP theory also has to be qualified to take into account the fact that product differentiation among countries significantly limits the elasticities of substitution among the goods that they supply even in the longer run. This has the major implication that any sustained changes in a country's endowment of economic resources, the pattern of demand for its products, or the determinants of its net capital flows may have to be offset by a change in price competitiveness if the country's overall payments balance is to remain in equilibrium in the longer run. Thus, any assessment of an exchange rate requires both a consideration of changes in competitiveness that have actually taken place and an analysis of the change that would be called for to restore the overall balance of payments to a sustainable level. 1/

There are also cases, particularly among the smaller industrial countries, where the validity of the assumption that the overall price level in local currency tends to be determined mainly by domestic factors is less tenable. As long as rigidities in the goods and labor markets are not too extreme, overall price levels will normally remain consistent with domestic monetary developments in the longer run. In this sense, domestic monetary policy can be viewed as the major determinant of a country's overall price level. Nevertheless, large changes in nominal exchange rates can create pressures on the monetary authorities that cannot always be fully resisted. While the strength of these pressures differs from country to country depending in part on the degree of openness of the economy and the pervasiveness of wage indexation, some allowance must normally be made for the feedback effect of exchange rate changes onto costs and prices in local currency. For example, a change

1/ This issue will be considered in more detail in Section IV below.

in the nominal exchange rate of 10 percent might induce a more or less automatic rise in domestic currency costs and prices of, say, 3 percent. Thus, a study that concluded that the nominal exchange rate was 10 percent too high on the basis of current prices at home and abroad might imply that the nominal rate should be changed by 13 percent in order for it to return to a sustainable level in real terms.

2. Some measures of competitiveness used by the Fund staff

Most of the work done in the Fund on the measurement of competitiveness among industrial countries has focused on the five indicators now published on a quarterly basis in International Financial Statistics (IFS). All five indicators measure aspects of the international competitiveness of a country's manufacturing sector. The first three indices--those for relative export unit values, wholesale prices and value-added deflators--reflect price competitiveness. The last two indices--those for unit labor costs and normalized unit labor costs--are intended to reflect cost competitiveness. The weighting scheme for all of the indicators has been designed to take account not only of bilateral trade, but also of the degree to which various countries effectively compete because they tend to export the same types of products to the same geographic markets. 1/

For the purpose of assessing the sustainability of exchange rates, the first two indicators have important limitations that tend to cause them to underestimate changes in international price competitiveness. For the indicator based on export unit values this problem arises because, even though goods may be differentiated, international competition places limits on how far an exporter's prices can diverge from those charged by competitors. The indicator also fails to reflect the prices of goods that are not exported anymore because their domestic production costs exceed the prices at which they would be competitive in world markets. Similarly, prices for the relatively homogeneous products that have a heavy weight in the wholesale price index tend to be similar across countries after adjustment for exchange rate changes, but this is hardly a sign that competitiveness among countries is constant. 2/ In addition, both wholesale and export price indicators are often strongly biased as a result of composition effects because the structure of

1/ The weighting scheme is built up from disaggregated trade data for manufactures and reflects both the relative importance of a country's trading partners in its bilateral trade and the relative importance of its competitors in third markets.

2/ The wholesale price index is also subject to problems of double counting, since the prices of certain intermediate commodities may be counted both separately and as part of final output.

exports and the weighting structure of wholesale price indices differ substantially across countries.

While the next indicator of price competitiveness--the index based on value-added deflators in manufacturing--is normally more relevant, it also has important disadvantages. The main drawback of this indicator is that actual data are published with a long lag, and are available quarterly for only a few countries. It is generally necessary for the staff to extrapolate for five or six quarters beyond the most recent benchmark year on the basis of wholesale prices for manufactures adjusted to exclude the influence of changes in raw materials prices. This is a severe limitation since, as explained above, movements in wholesale price indices can often be a misleading indicator of changes in competitiveness.

Given the problems with measures of price competitiveness, more reliance is generally placed on indices of labor cost developments in the manufacturing sector. However, the fourth indicator--that based on current labor costs--is very sensitive to cyclical changes in productivity over periods of several years. For this reason, the indicator based on normalized unit labor costs (i.e., adjusted for cyclical variations in productivity) has generally been regarded as the most useful in assessing exchange rates, and it was recently selected to implement the experimental system of information notices for the 13 member countries for which the indicator is available. ^{1/} Thus, it is particularly useful to discuss the main characteristics of this indicator at some length and to analyze its past behavior.

The series on normalized unit labor costs are calculated by dividing an index of actual hourly compensation per worker by an index of output per manhour adjusted so as to eliminate estimated cyclical swings in productivity. ^{2/} The indicator for each country represents the ratio of that country's index of normalized unit labor costs to a weighted geometric average of corresponding indices for the other 13 industrial countries included in the analysis, after all of the national indices are expressed in terms of a common currency.

To the extent that the price structure in a country's factor markets tends to fluctuate less over time than the price structure of its goods markets, the normalized unit labor cost indicator benefits from its focus

^{1/} The data are published for the following member countries: the United States, Canada, Japan, France, Federal Republic of Germany, Italy, Norway, Sweden, Denmark, Austria, Belgium, the Netherlands, and the United Kingdom; they are also available for Switzerland.

^{2/} A technical note on the indicator is provided in each issue of IFS, usually on p. 49.

on factor prices rather than goods prices; in particular, there is less risk of a composition bias. Moreover, factor prices in the tradable goods sector--particularly money wage rates--are less subject than goods prices to direct foreign influences. Price indices for factors of production in the tradable goods sector can, therefore, be used directly. There is less need to estimate the relative long-run evolution of the tradable versus the nontradable sectors, or to make allowance for the distorting effects of competitors' prices on domestic prices.

However, these conceptual advantages are relative rather than absolute; that is, they are significant mainly in relation to the major disadvantages of alternative indicators. In particular, the risk of serious composition bias, while smaller than for alternative indicators, is not negligible. Rates of growth of productivity may differ widely among industries and, as indicated above, such cross-country differences may reflect primarily their differing compositions of total manufacturing output. Moreover, since the only factor of production included in this indicator is labor, it may be biased because of cross-country differences in longer-run rates of change in capital-labor ratios. To eliminate this source of bias it would be necessary to adjust the changes in productivity (in terms of output per manhour) for the effects of changes in capital-labor ratios; this is a difficult task that has not so far been attempted by the staff.

3. Reliability of the normalized unit labor cost indicator

The practical reliability of the normalized unit labor cost indicator can be assessed by (i) considering its historical performance, (ii) analyzing whether merchandise trade flows are, in fact, responsive to movements in this particular indicator of international competitiveness, and (iii) determining whether developments in normalized unit labor costs in local currencies are largely independent of nominal exchange rate movements.

a. Historical performance of the normalized unit labor cost indicator

As an aid to analyzing the historical behavior of the indicator of relative normalized unit labor costs, Chart 2 presents quarterly data for 12 member countries. ^{1/} The period covered in the chart runs from

^{1/} As noted above, the indicators of manufacturing-sector cost and price competitiveness are available in IFS for 14 countries. For purposes of exposition, however, only 12 of these countries are included in the panels of Chart 1. The omitted countries are Austria and Switzerland.

the beginning of 1963 to the first quarter of 1983. On the strict assumptions of the PPP theory, one would expect the data for the real effective exchange rate based on normalized unit labor costs to exhibit relatively short-lived fluctuations around a more or less stable long-run trend. Furthermore, one would also expect fluctuations around the trend to be closely associated with overshooting of the nominal exchange rate resulting from short-run developments in financial markets. Even if these assumptions were not fully satisfied, however, international price comparisons could still be useful so long as the timing and magnitude of shifts in cost and price competitiveness were clearly associated with recognized major structural changes in the goods and capital markets.

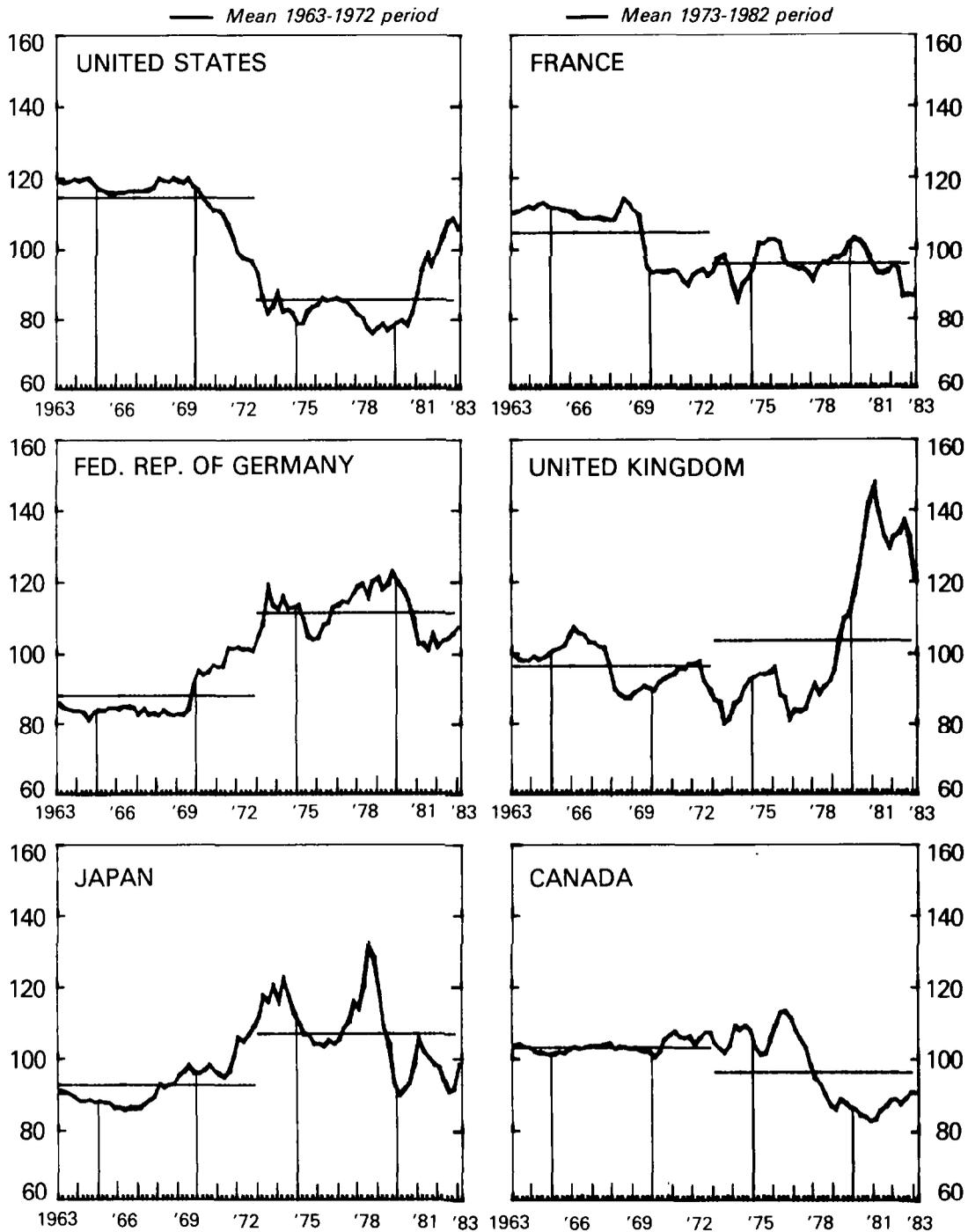
The information in Chart 2 suggests that, on the above criteria, the record of the normalized unit labor cost indicator of the real exchange rate during the past 20 years has been mixed. First, there are five countries--the United States, Japan, Canada, Italy, and the Netherlands--for which the level of the normalized unit labor cost indicator in the first quarter of 1983 differed by less than 15 percent from the level that had prevailed in the first quarter of 1963. However, for these countries the difference between the maximum and minimum levels of the real effective exchange rate during the 20-year period was more than 30 percent, and in the case of the United States the average level of the real effective exchange rate during the period 1973-1982 was 35 percent lower than it had been during the preceding decade. In addition, while marked movements in the real effective exchange rate were associated with similar movements in nominal effective exchange rates, such movements tended to persist rather than being reversed in a few years. Examples are the appreciation of the Dutch guilder between 1963 and 1974, and the depreciation of the U.S. dollar between 1969 and 1973.

Second, in two cases--Norway between 1969 and 1977, and the United Kingdom between 1976 and 1981--the sharp appreciation in the real effective exchange rate was associated with a major structural change, namely the discovery and exploitation of North Sea oil reserves. Even in these cases, however, it is noteworthy that the changes in real effective exchange rates associated with the structural shifts were very large, raising the question of whether the movements that actually occurred were an appropriate response to the change in comparative advantage, or whether they partly represented overshooting of the nominal effective exchange rate. The competitiveness indicators, taken by themselves, provide only limited information on this issue. Furthermore, while the shifts that occurred in Norway and the United Kingdom were particularly large ones, most other industrial economies also experienced significant structural changes during this period. The magnitudes of the changes in the real effective exchange rates of Norway and the United Kingdom

CHART 2
SELECTED INDUSTRIAL COUNTRIES:
RELATIVE NORMALIZED UNIT LABOR COSTS IN
MANUFACTURING, ADJUSTED FOR
EXCHANGE RATE CHANGES¹

First Quarter 1963 - First Quarter 1983

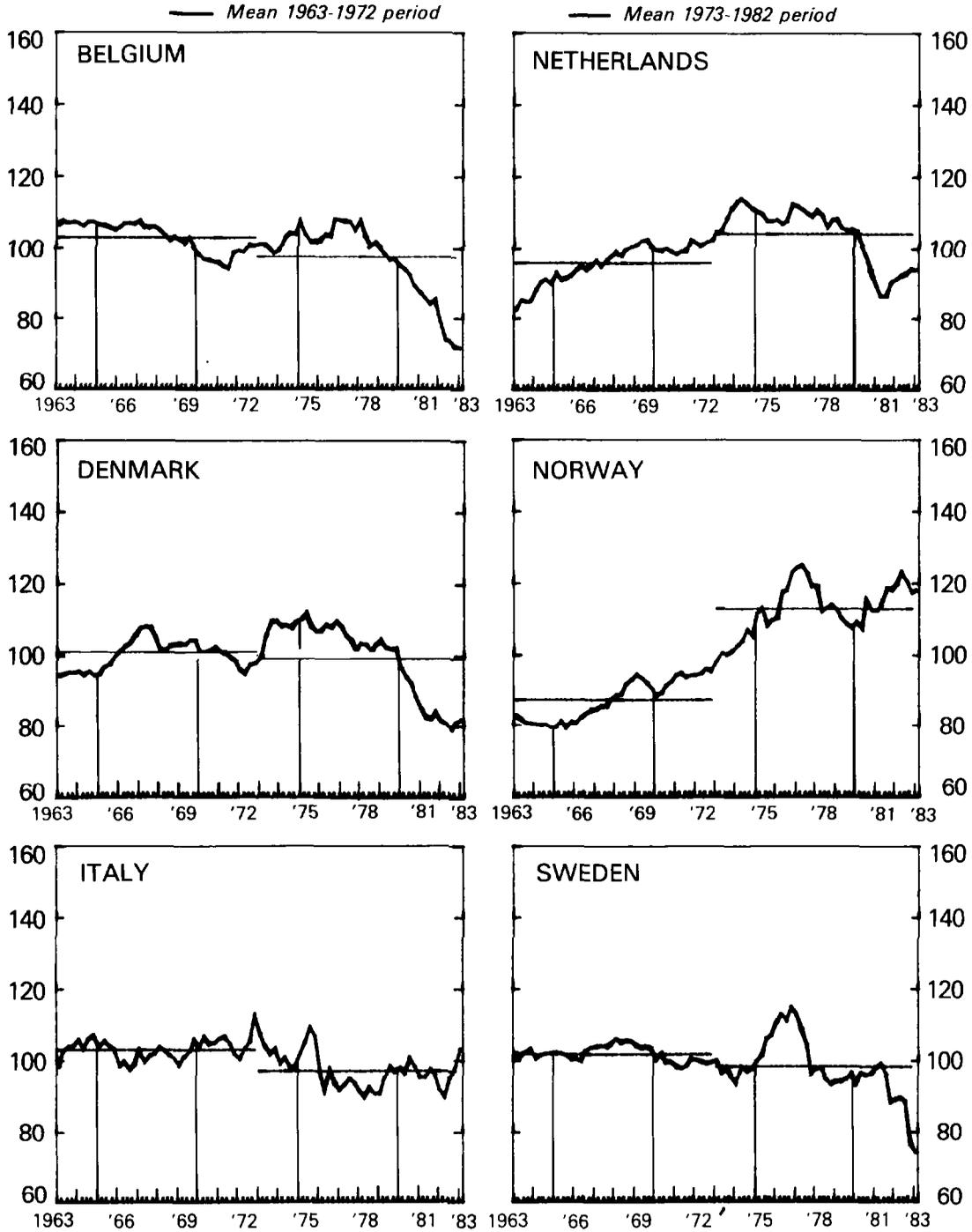
(Period average 1963-1982 = 100)



¹Data on normalized unit labor costs for the first quarter of 1983 are preliminary estimates.



CHART 2 (concluded)
SELECTED INDUSTRIAL COUNTRIES:
RELATIVE NORMALIZED UNIT LABOR COSTS IN
MANUFACTURING, ADJUSTED FOR
EXCHANGE RATE CHANGES¹
First Quarter 1963 - First Quarter 1983
(Period average 1963-1982 = 100)



¹Data on normalized unit labor costs for the first quarter of 1983 are preliminary estimates.



suggest that even the effects of smaller structural changes on the sustainable exchange rate cannot necessarily be neglected in making assessments of international price competitiveness.

Third, there are a number of cases where the indicator depicted in Chart 2 did not suggest a worsening of international competitiveness, but the countries concerned experienced growing external imbalances. For example, the current account and overall payments positions of Belgium, Denmark, and Sweden began to weaken from the mid-1970s, even though their international competitiveness as measured by the relative unit labor cost indicator showed little deterioration during this period. Furthermore, despite the substantial apparent improvement in the competitiveness of Belgium and Denmark according to the conventional measures during the period 1979-1981, these countries failed to show a significant recovery of export volumes, manufacturing sector employment, or current account balances. In Sweden, the combined effects of the 1981 and 1982 devaluations led in 1983 to improved international competitiveness, a gain in market shares for manufactured exports and to an improvement in the profitability of Swedish industry. Nevertheless, the experience of these three countries suggests the need for caution in interpreting statistical indicators of competitiveness.

The three country cases cited above suggest that there is a variety of situations where standard indicators such as relative normalized unit labor costs appear to provide only limited information about changes in a country's international competitiveness or in the sustainable level of its exchange rate. For this reason, the staff, in analyzing exchange rate sustainability on the basis of competitiveness indicators, has on occasion extended its analysis to incorporate other types of evidence including trends in manufacturing sector profitability, export market shares, and capital formation in the sectors exposed to foreign competition. ^{1/} Such supplementary indicators suggest the possibility that during the latter years of the 1970s these countries experienced a significant deterioration in their overall international competitiveness even though their indices of relative normalized unit labor costs (Chart 2) were showing an improvement. Two likely causes of such a development are: a loss of comparative advantage in traditional export industries (such as shipbuilding, machine tools, and autos (Sweden), and

^{1/} See, for example, "Belgium and Luxembourg - Staff Report for the 1982 Article IV Consultation" (SM/82/177, 8/25/82); "Netherlands - Staff Report for the 1982 Article IV Consultation" (SM/82/244, 12/30/82), especially p. 5; and "France - Staff Report for the 1983 Article IV Consultation" (SM/83/69, 5/9/83), especially pp. 2-4.

textiles and steel (Belgium)); and/or a process of "marginalization" in which the squeeze on profits caused by domestic cost increases in excess of the rise in world market prices forced the least viable firms in the tradable goods sector out of business.

For example, during the mid-1970s Belgium experienced strong wage push pressures that sharply reduced the rate of growth of output in the manufacturing sector and led to the fastest rate of decline in manufacturing sector employment among the industrial countries. However, since marginal firms were being eliminated at a relatively rapid rate, the measured growth of labor productivity in the Belgian manufacturing sector accelerated, and standard indicators of the real effective exchange rate actually showed a gain in Belgium's international competitiveness after 1977. Similar developments may have affected the indices of competitiveness for such countries as Denmark, the Netherlands, and Sweden. ^{1/} Such explanations provide an ex post rationale for the lack of correlation between the apparent improvement in relative unit labor costs and current account developments, but they give little indication of the size of the change in the real exchange rate index that would have produced a sustainable overall payments position.

Fourth, in some cases the timing of the change in the indicator depicted in Chart 2 differed substantially from the timing of major structural changes in the goods and capital markets. For example, between 1969 and 1974 the real effective exchange rate of the U.S. dollar depreciated by 29 percent, that for the Federal Republic of Germany appreciated by 32 percent, and that for Japan appreciated by 15 percent. These large changes in the indicators of international competitiveness occurred during the transition from the Bretton Woods regime of fixed exchange rates to one of managed flexibility, but they were not associated with any specific developments in the structure of goods or capital markets. It is widely assumed that during the period prior to 1970-73 there was a steady deterioration in the competitiveness of the United States relative to Germany and Japan which accounted for the large change that occurred subsequently. However, the empirical indicator of cost and price competitiveness, which remained relatively stable for all three of these countries during the period from 1963 to 1969 (Chart 2), gave little prior warning about either the size of this disequilibrium or the need for a change in real exchange rates.

^{1/} Recent movements in labor productivity in Ireland may also have been influenced by large-scale shedding of labor. See "Ireland - Staff Report for the 1983 Article IV Consultation," (SM/83/126, 6/14/83) p. 3.

Even after the fact, the timing of exchange rate movements can only be attributed to the change that occurred in the exchange rate regime, suggesting that during this period national authorities were able, through their policy actions, to maintain exchange rates at unsustainable levels for substantial periods of time. While such leeway has doubtless been reduced to the extent that capital has become increasingly mobile since the early 1970s, the possibility remains that competitiveness indices may give only limited warning of such misalignments.

Fifth, since standard indicators of a country's international competitiveness are based on weighted averages of bilateral real exchange rates, the issue arises as to whether the weights used are an accurate reflection of the relative importance of partner countries. If this were not the case, changes in bilateral real exchange rates between countries that are close trading partners could lead to substantial longer-term changes in the structure of trade, even if--because of offsetting movements in bilateral rates--standard measures of overall competitiveness appeared stable. This issue is important because actual movements in bilateral rates have been considerable. Chart 3 presents data on the real bilateral exchange rates between the deutsche mark and the currencies of five of its EMS partner countries (France, Italy, Netherlands, Belgium, and Denmark). It is apparent from these data that even in the case of closely-integrated economies that belong to a regional exchange arrangement, movements in real bilateral exchange rates were rather large, both prior to the setting up of the EMS and subsequently.

b. Responsiveness of trade flows to changes in the normalized unit labor cost indicator

An alternative way of looking at the usefulness of indicators of international competitiveness is by attempting to measure the responsiveness of trade flows to changes in these indicators. If a country's trade balance is observed to deteriorate sharply when its index of normalized unit labor costs rises relative to its trading partners, then this index is providing accurate signals of changes in competitiveness, at least as far as merchandise trade is concerned. In order to measure the response of trade flows to changes in the relative normalized unit labor cost indicator, the equations representing demands for exports and imports of manufactures in the Fund's World Trade Model were re-estimated using these indices as the relative price terms. The results are presented in Table 2. If the long-run elasticities of manufacturing exports and imports with respect to the index of relative normalized unit labor costs are large and relatively precisely estimated, this result tends

Table 2. Fourteen Industrial Countries: Price Elasticities of Trade in Manufactures With Respect to Relative Normalized Unit Labor Costs ^{1/}

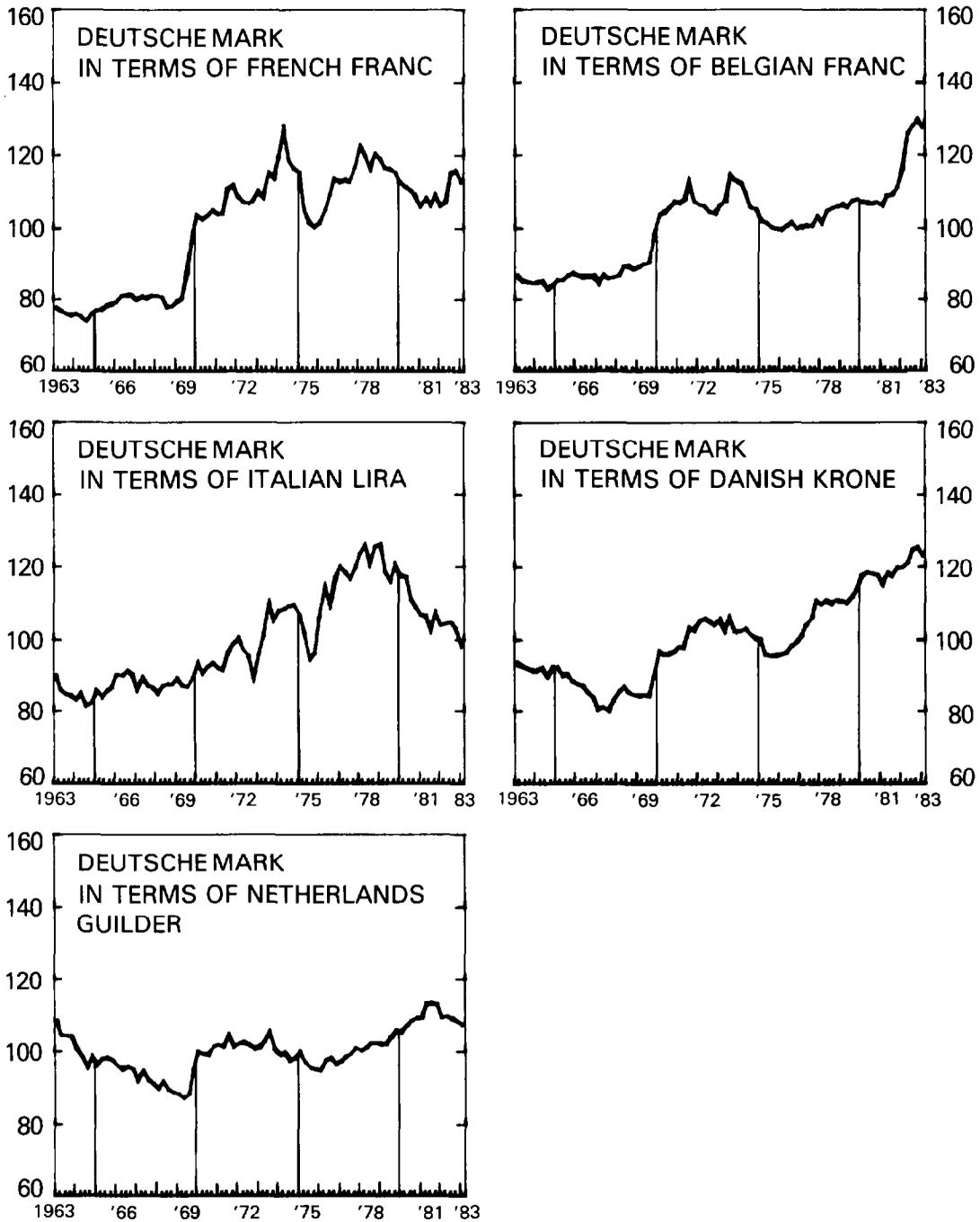
	Imports		Exports	
	Impact Elasticity	Long-Run Elasticity	Impact Elasticity	Long-Run Elasticity
Austria	-0.09	-0.72 (0.33)	-0.33	-0.56 (0.24)
Belgium	--	--	-0.06	-0.52 (0.29)
Canada	-0.12	-0.12 (0.19)	-0.33	-1.14 (0.26)
Denmark	-0.17	-0.17 (0.09)	-0.12	-0.12 (0.17)
France	-0.23	-0.60 (0.21)	-0.13	-0.48 (0.14)
Fed. Rep. of Germany	-0.08	-0.49 (0.18)	-0.01	-0.36 (0.13)
Italy	-0.58	-0.58 (0.30)	-0.11	-0.51 (0.40)
Japan	-0.06	-1.27 (0.32)	-0.35	-1.30 (0.28)
Netherlands	-0.18	-0.20 (0.55)	--	-0.07 (0.40)
Norway	-0.11	-0.47 (0.59)	-0.23	-1.25 (0.70)
Sweden	-0.33	-0.45 (0.28)	-0.42	-0.82 (0.17)
Switzerland	--	-1.10 (0.25)	--	-0.18 (0.18)
United Kingdom	-0.26	-0.78 (0.22)	-0.03	-0.16 (0.18)
United States	--	-1.03 (0.23)	-0.26	-0.93 (0.19)

^{1/} The impact elasticity gives the response of import or export volume in the first six months; the long-run elasticity gives the total response, which is generally assumed to occur within 2-3 years. Standard errors are in parentheses.

CHART 3
SELECTED MEMBER OF EMS:
BILATERAL RELATIVE
NORMALIZED UNIT LABOR COSTS IN MANUFACTURING,
ADJUSTED FOR EXCHANGE RATE CHANGES

First Quarter 1963-First Quarter 1983

(Period average 1963-1983=100)



¹Data on normalized unit labor costs for the first quarter of 1983 are preliminary estimates.



to increase the degree of confidence that can be placed on this indicator of international competitiveness as a measure of the extent to which a given exchange rate was sustainable. As the table indicates, the estimated short-run elasticities of imports and exports with respect to changes in normalized unit labor costs are rather small and the long-run elasticities, though larger, are less than unity in many cases. These results suggest that the responsiveness of trade flows to the index that is most frequently used in making international price comparisons is limited, even in the longer run. Of course, the evidence provided by this table is tentative, owing to the difficulty of distinguishing among trend developments, structural shifts, and the longer-run effects of lagged price changes in the econometric determination of foreign trade flows.

c. Feedback effects of exchange rate changes on normalized unit labor costs

A further issue that arises in using indicators of international competitiveness is that of the extent to which a major change in the nominal effective exchange rate will create feedback effects that alter the levels of prices or unit labor costs in a direction that tends to restore purchasing power parity. Chart 4 provides evidence on this issue for periods corresponding to relatively large changes in the nominal effective exchange rates of three major industrial countries (the United States, Japan, and the Federal Republic of Germany) and three of the smaller countries (Belgium, Norway, and Sweden). In the charts, the dashed line is the nominal effective exchange rate (foreign currency per unit of domestic currency) while the solid line is the ratio of partner country unit labor costs expressed in local currency to those in the country under consideration. If there is a significant feedback effect from exchange rates onto domestic labor costs, then one would expect to see an appreciation of the nominal effective exchange rate (a rise in the dashed line) followed by a rise in the solid line, reflecting a slower rate of increase in domestic-currency unit labor costs relative to those prevailing abroad. The six panels in Chart 4, however, provide little evidence that the feedback effects of exchange rate changes onto domestic unit labor costs are significant for either the larger or the smaller countries considered.

4. Note on consumer price indicators

Even though, as noted above, most of the work done in the Fund on the measurement of competitiveness among industrial countries has focused on the five indicators for manufacturing published in IFS--particularly on the indicator based on normalized unit labor costs--there are a number

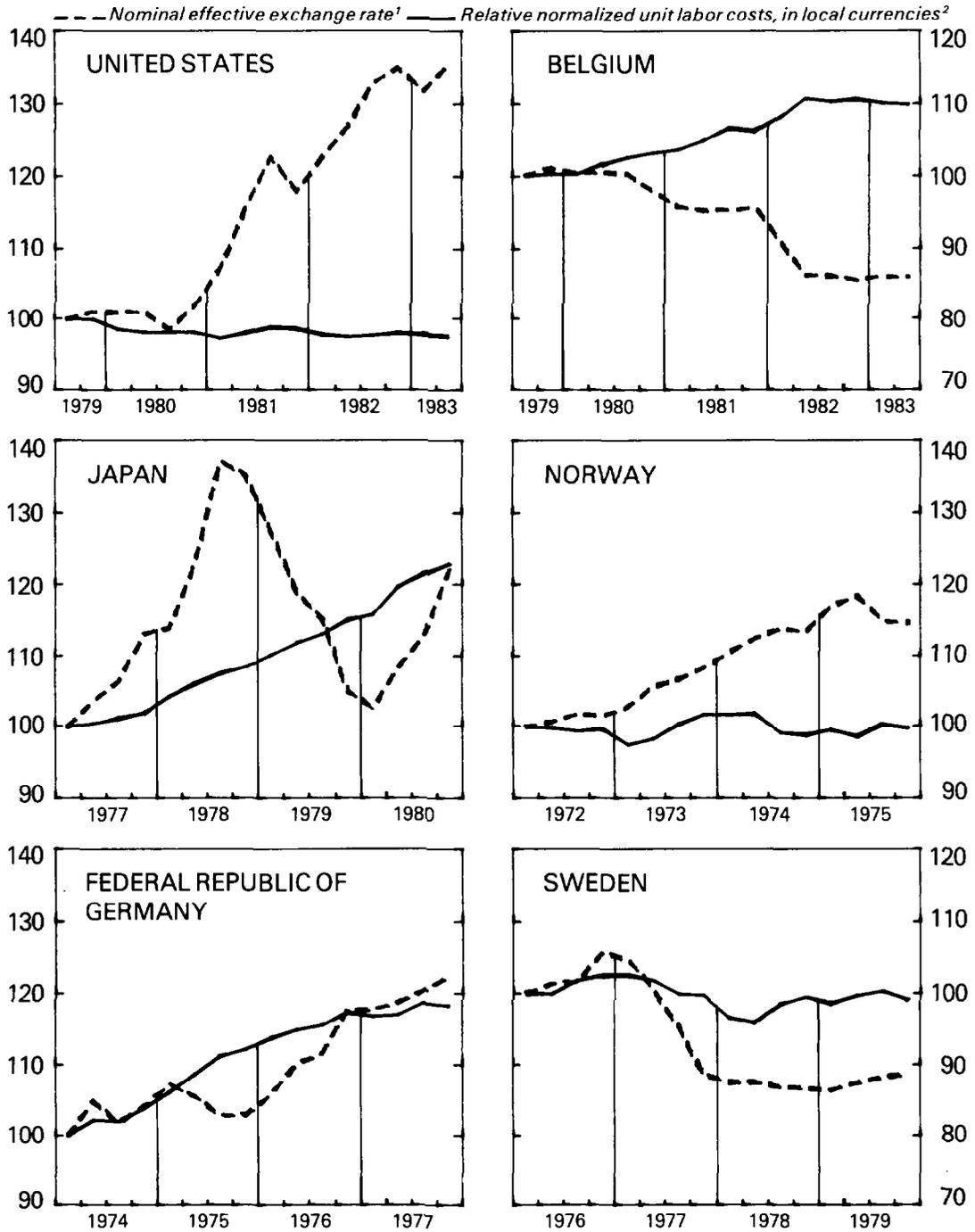
of countries where considerations of data availability have so far precluded the calculation of such indicators. For these countries, as well as for developing countries, the measurement of competitiveness is often based on consumer price indices, as for example in the system of information notices for real exchange rate movements that is being undertaken on an experimental basis by the Fund. For this reason, it is useful to compare the indicator based on consumer prices with that based on normalized unit labor costs in cases where the two indicators can be calculated. To illustrate the results of such a comparison, the left hand panels of Chart 5 display the real bilateral exchange rates between Japan and the United States, the Federal Republic of Germany, and the United Kingdom, respectively, based on both consumer price indices (dotted line) and indices of normalized unit labor costs (solid line). For all three cases, the two indices essentially show a similar pattern of variation throughout the period chosen. Nevertheless, owing to their differing longer-term trend movements, the levels of the two indicators diverged very markedly by the end of the full 20-year period. For example, compared with the Q1 1963 base period, the cumulative net appreciation of Japan's real exchange rate vis-à-vis the United States was 78 percent when measured in terms of the indicator based on consumer prices but only 30 percent when measured in terms of normalized unit labor costs. Japan's real exchange rate with the Federal Republic of Germany experienced a net appreciation of nearly 60 percent in terms of consumer prices, whereas the normalized unit labor cost indicator, by contrast, indicated a net depreciation of 8 percent. Similarly, using the former indicator, Japan's real exchange rate vis-à-vis the United Kingdom experienced a net appreciation of 73 percent, whereas the latter measure showed a slight depreciation against sterling.

Given Japan's trade performance vis-à-vis the other three countries cited in Chart 5, the indications of cumulative changes in Japan's international competitiveness provided by the normalized unit labor cost indicator seem much more plausible than those based on consumer prices. This conclusion is not surprising, since long-run increases in the relative prices of nontraded goods were a major source of trend movements in Japan's consumer price index during the period considered. These observations suggest that although relative normalized unit labor costs and consumer prices may give similar indications of short run developments, the former indicator is superior for the analysis of trends in international competitiveness over periods spanning several years.

A further problem that arises in using competitiveness indicators based on consumer prices, illustrated in the right hand panel of Chart 5, is the fact that consumer prices are more sensitive than unit labor cost indicators to the feedback effects of nominal exchange rate changes,

CHART 4
SELECTED INDUSTRIAL COUNTRIES:
NOMINAL EFFECTIVE EXCHANGE RATES AND RELATIVE
NORMALIZED UNIT LABOR COSTS, IN LOCAL CURRENCIES

(First quarter of sample period = 100)



¹Foreign currency per unit of domestic currency.

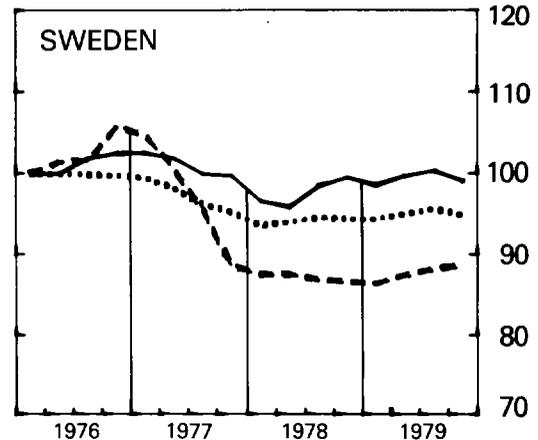
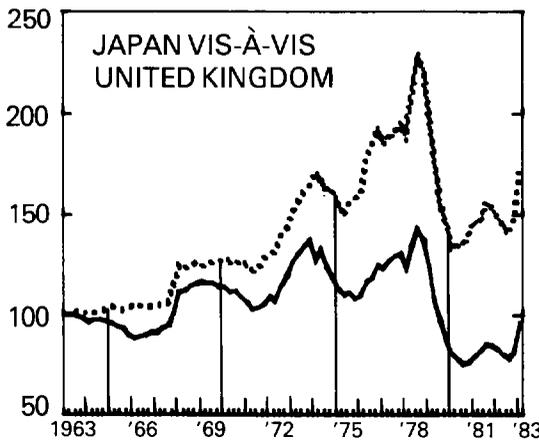
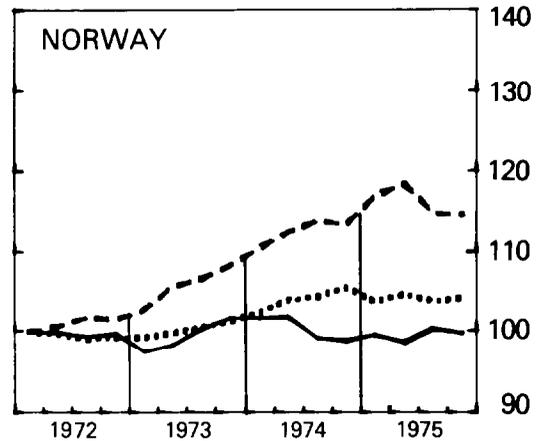
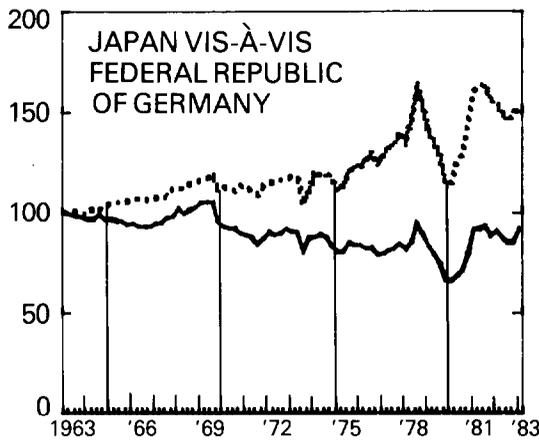
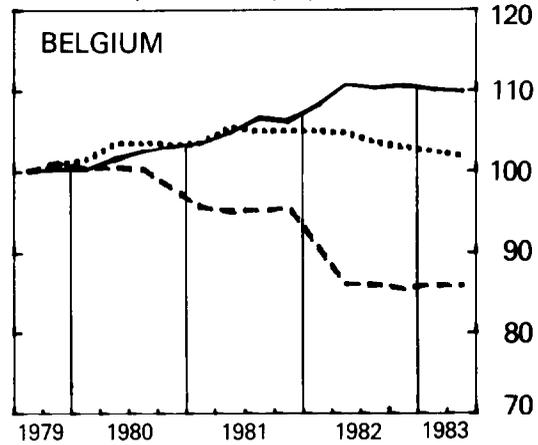
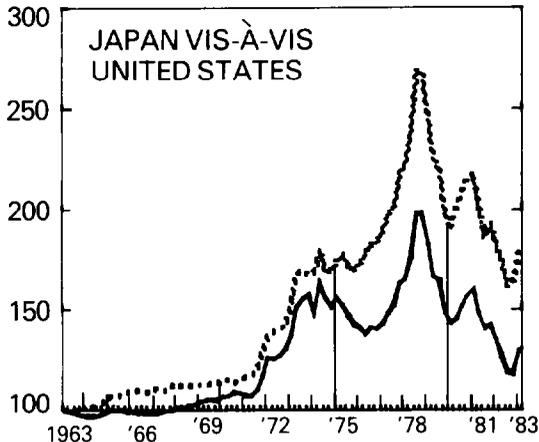
²Ratio of partners' to own labor costs.



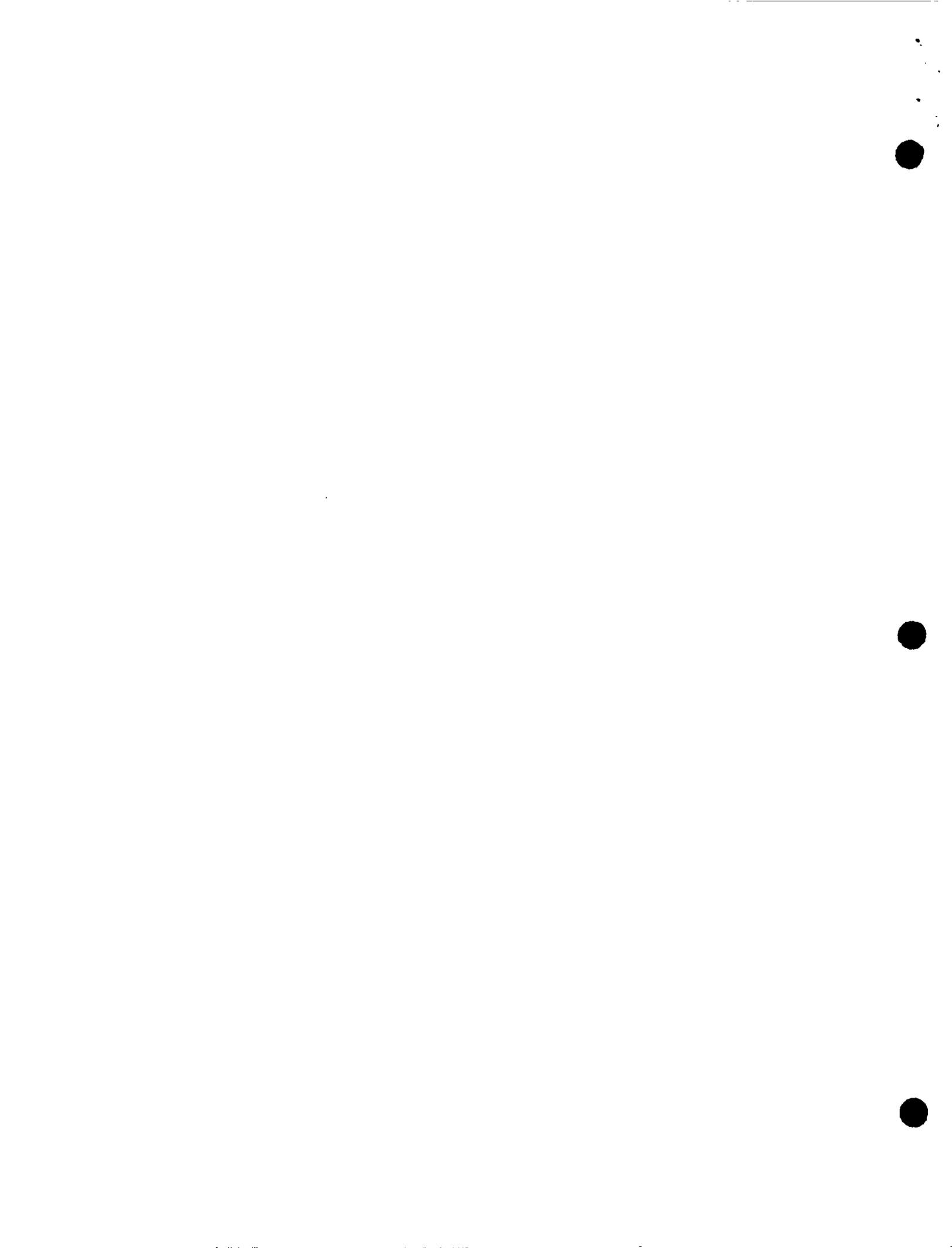
CHART 5

SELECTED INDUSTRIAL COUNTRIES:
INDICATORS OF COMPETITIVENESS
BASED ON CONSUMER PRICES

— Bilateral relative normalized unit labor costs, adjusted for exchange rate changes
 Bilateral relative consumer price indices, adjusted for exchange rate changes
 - - - Nominal effective exchange rate¹
 — Relative normalized unit labor costs, in local currencies²
 Relative consumer price indices, in local currencies²



¹Foreign currency per unit of domestic currency.
²Ratio of partners' to own labor cost or consumer prices.



particularly because a significant portion of the consumption basket consists of imports. The right hand panels of Chart 5 are the same as those presented in Chart 4, except that a dotted line has been added to represent the ratio of partner country to domestic consumer prices, with each measured in local currency. In all three cases, there appears to be some evidence of a feedback from exchange rate changes onto domestic consumer prices. For example, the February 1982 devaluation in Belgium appears to have fed through onto domestic consumer prices more strongly than onto unit labor costs in local currency, owing to the large weight of imported goods in the consumer price index and the implementation of a strict incomes policy.

5. Summary

The discussion of this section suggests the need for caution in using standard indices of international competitiveness to assess the longer-run sustainability of a country's exchange rate and external position, particularly at times when major changes are occurring in underlying real sector conditions. There can often be cases where a given exchange rate is no longer sustainable, despite the apparent stability of conventional measures of the real effective exchange rate. In such circumstances, evidence based on indices of competitiveness must be supplemented by other information on the economy, such as data on the return on capital in the tradable goods sector, or on the growth of the nontradables sector (particularly public services) relative to the traded sector over time.

IV. Underlying Payments Balances

In view of the narrow focus of indicators based on measures of goods market competitiveness, the analysis normally has to be extended to take into account the many factors other than relative price movements that may exert major persistent effects on a country's overall balance of payments, including capital transactions as well as current transactions. These factors encompass such developments as long-run changes in comparative advantage and in propensities to save and invest, as well as policy changes that affect the rates of domestic absorption for a number of years. Thus the aim of this more comprehensive analysis becomes the assessment of the "underlying" external position of the country, after adjustment for the main temporary factors that may influence the currently observed level of its balance of payments, and taking account of any factors that are expected to have a persistent effect over the next

few years. Once this assessment has been made on the basis of the current exchange rate, it can then be used to evaluate whether the currently observed rate is likely to be sustainable in the medium term.

The major departure from the simple analysis of competitiveness is that instead of assuming that there is a tendency to return to some base period level of the real exchange rate, this analysis is specifically concerned with the determination of the sustainable real effective exchange rate for the period ahead, whether or not that rate has actually been observed in the past. Furthermore, attention is focused not only on foreign trade and the current account balance, but also on the longer-term evolution of capital flows. Finally, an assessment of the underlying balance of payments takes account of the impact of the stance of economic policies on the sustainable level of a country's exchange rate.

The analysis of countries' external positions and its use for the assessment of exchange rates have of course been at the center of Fund activities since the creation of the institution. However, it was mainly as a result of the systemic crises that occurred in the early 1970s that attempts were made to develop the Fund's work on the measurement of underlying payments positions in the industrial countries, and to apply it on a comprehensive and multilateral basis. In October 1971, a report was prepared on, "Estimation of Desirable Changes in Payments Balances on Current Account," (EBS/71/271, 10/7/71). The report was presented as a contribution towards attaining an agreement regarding the extent to which payments balances on current account should be made to change (through a change in the structure of parities) from those that could be expected to prevail with exchange rates at existing parities. The move towards greater exchange rate flexibility in 1973, and the major exchange rate swings that occurred subsequently, led to an intensification of this work.

Following presentation of the initial results to the Executive Board during 1975 and January 1976 (see mainly, SM/75/173, 7/2/75, and SM/76/32, 2/12/76) the Board decided that officials in the industrial countries should make a technical evaluation of the work, and a conference was held for this purpose at the Fund's European Office in February 1976. Subsequent to that conference, the staff's work in this field began to be used systematically in World Economic Outlook papers, as well as in papers for exchange rate "seminars" and in the Managing Director's reports to the Interim Committee. This led to a series of bilateral meetings with officials of all the industrial countries during the period June-October 1978 and a second conference at the Fund's

European office in October 1978. ^{1/} As mentioned in the introduction, the work was interrupted in 1980 as far as the multilateral assessment of exchange rates was concerned because underlying economic conditions had become so unstable that it was excessively difficult to assess underlying payments positions. ^{2/} Nevertheless, application of the method to specific cases continued; see, for example, the Staff Report for the 1982 Special Consultation Under Article IV with Sweden (EBS/82/222, 12/3/82).

This section presents a brief review of the staff's approach to the estimation of underlying payments balances and illustrates it by assessing the underlying payments positions of the three largest industrial countries on the basis of the average exchange rate levels that prevailed in June 1983. The numerical estimates are presented exclusively for the purpose of illustration.

1. Procedures for assessing a country's underlying external payments position

From an analytical standpoint, the assessment of a country's underlying payments position and its corresponding sustainable exchange rate can be divided into three separate steps:

(1) Estimation of the current account position adjusted for temporary factors and anticipated developments. Temporary factors include disturbances such as crop failures, strikes, etc. Anticipated developments may be divided into three broad categories: (i) expected effects of past exchange rate and relative price changes, (ii) effects resulting from the unwinding of "abnormal" relative cyclical positions, and (iii) other types of developments that are expected to occur in the medium term.

First, if large changes in prices and exchange rates have occurred in recent years, it is necessary to take into account those price effects that are still "in the pipeline," in order to avoid reaching an incorrect judgment of the underlying payments position. Such judgments therefore

^{1/} A report on these bilateral meetings and on the conference, with a more detailed history of the staff's work in this field, was issued to the Executive Board as Secretary's Circular No. 78/148, 12/8/78.

^{2/} With the major change in economic conditions, the orientation of the work also changed. In particular, scenarios were set up to analyze the medium-term prospects for growth and inflation in industrial countries, and for external positions in developing countries.

require an assessment of the lagged response of merchandise trade and services flows to relative price movements that have already taken place.

Second, account must be taken of relative cyclical positions and their effects on trade flows among industrial countries. In the 1960s and early 1970s economic fluctuations tended to be moderate in amplitude, so that it was meaningful to speak of a cyclically neutral level of economic activity corresponding to a reasonable norm of full employment, and to expect this neutral level of economic activity to prevail, on average, over the medium term. For all practical purposes, what was involved was the calculation of a full-employment current account balance. Cyclical movements in trade flows could be viewed as transitory phenomena of little importance for assessing exchange rates. Owing to the spread of stagflation and the rise in average levels of unemployment, however, it became clear by the mid-1970s that such an approach had ceased to be realistic. Consequently, the staff began to define "abnormality" of cyclical positions in relation to what could be expected to prevail after a medium-term period of two or three years, rather than in relation to the notional full-employment level of economic activity. Because it is extremely difficult to project cyclical developments, the staff also began to consider a number of scenarios embodying alternative assumptions as to future policy stances and other economic developments.

Third, each country's current account position must be adjusted for other types of expected future developments, including both longer-term trends that are apparent in the components of each country's current and capital accounts and significant anticipated shifts. Examples in this category include allowance for the effects of expected shifts in items such as private and official international transfers; movements in trade balances on account of energy products arising from conservation measures, or other factors; and changes in the size and direction of private capital flows owing to major tax and regulatory reforms that affect saving and investment decisions. It is in attempting to estimate the effects of these other developments that the most serious difficulties are encountered. An unconditional medium-term forecast is not feasible, since what happens will depend on policies and conditions that will be in effect a few years hence. Even projections that are contingent on certain policy assumptions are difficult to make, since the implications of various policy choices are uncertain. The problem is already present in the estimation of cyclical effects, but it is even more severe in

the case of the many longer-run structural changes that affect foreign trade flows. 1/

(2) Calculation of the current account position that corresponds to a sustainable structure of the overall balance of payments, including some estimate of the level of capital flows that is likely to prevail in the medium term and a reasonable target for growth in the country's official holdings of (net) international reserves. The estimate of the sustainable balance of payments structure should reflect factors that influence the longer-run evolution of aggregate flows of domestic saving and investment, including the tendency for net saving or dissaving by the public sector. Major structural or other noncyclical developments--such as the exploitation of the North Sea oil fields by Norway and the United Kingdom, or the recent moves toward import liberalization by Japan--must also be taken into account, since they may warrant a sustained change in the balance of payments structure.

(3) Estimation of the sustainable exchange rate. The comparison of the present underlying current account position resulting from step (1) with the normal current account position resulting from step (2) provides an estimate of the underlying current account disequilibrium. The deviation of the actual exchange rate from the sustainable exchange rate can then be estimated by judging the change in the exchange rate that would bring about the needed current account adjustment.

2. Illustrative calculation of the underlying current account position

To illustrate the approach described above, Table 3 presents estimates of underlying payments positions on current account for the three largest industrial countries and for the other industrial countries as a group. These estimates were obtained by adjusting the most recent current account projections for 1983 in the following ways: 2/

1/ A solution that is attractive at first sight is to do the balance of payments analysis exclusively on the basis of current conditions, after adjustment for transitory disturbances and lagged effects of past relative price changes. The problem with this solution is that there is little doubt that private market participants' expectations of future events do affect their current behavior. If there are major developments on the horizon that private market participants can anticipate, ignoring these developments will lead to the estimation of a sustainable rate that could in fact be unsustainable not only in the longer run, but even in the short run.

2/ The 1983 projections are obtained from estimates prepared for the August report on the World Economic Outlook (ID/83/5, 8/19/83).

Table 3. Underlying Payments Balances on Current Account 1983 ^{1/}

(In billions of U.S. dollars)

	Current Balance Projection 1983 (1)	Adjustment for:					Scenario I Underlying Current Balance 6/ (6)	Scenario II Underlying Current Balance 7/ (7)	Official Transfers 8/ (8)	Scenario I	Scenario II
		Temporary Distur- bances ^{2/} (2)	Recent Relative Price Changes ^{3/} (3)	Changes in Relative Cyclical Positions ^{4/} (4)	Medium Term Tenden- cies ^{5/} (5)	Scenario I Underlying Current Balance 6/ (6)				Scenario II Underlying Current Balance 7/ (7)	Official Transfers 8/ (8)
United States	-29.2	0.2	-17.6	-10.2	-7.8	-64.6	-69.8	-5.6	-70.2	-75.4	
Germany	14.1	--	4.7	0.8	-3.1	16.5	18.6	-8.9	7.6	9.7	
Japan	24.2	-0.6	5.0	-1.6	6.4	33.4	36.1	-2.0	31.4	34.1	
Other industrial countries	-3.6	0.1	7.9	-0.2	3.1	7.3	7.0	-8.0	-0.7	-1.0	
Total industrial countries	5.5	-0.3	--	-11.2	-1.4	-7.4	-8.1	-24.5	-31.9	-32.6	
Other countries	-90.5	0.3	--	11.2	1.4	-77.6	-76.9	24.5	-53.1	-52.4	
Total ^{11/}	-85.0	--	--	--	--	-85.0	-85.0	--	-85.0	-85.0	

^{1/} All accounts are in constant 1983 prices.

^{2/} In Japan, recent import liberalization measures should increase import volumes from the second half of 1983; adjustments are required to give appropriate balances for the whole of 1983, both for Japan and for its trading partners.

^{3/} Estimates of the effects of changes in exchange rates and domestic price levels that occurred from 1980 through to the first semester of 1983, but are not reflected in 1983 trade flows.

^{4/} The effect of assumed changes in relative cyclical positions to 1986 on trade and services balances in terms of 1983 dollars.

^{5/} Effects over three years of estimated trend factors, including changes in fuels balances.

^{6/} The 1983 balances adjusted by the factors in columns (2) through (5).

^{7/} A further adjustment is made in column (7) for changes in relative cyclical positions which arise if prospective U.S. demand growth is assumed to be 1/2 per cent per annum higher, and prospective demand growth in Germany and Japan is assumed to be 1/2 per cent lower than in the central scenario.

^{8/} Includes effects over three years of estimated trend in official transfers.

^{9/} The sum of columns (6) and (8).

^{10/} The sum of columns (7) and (8).

^{11/} Reflects errors, omissions and asymmetries in reported statistics, plus balance with other countries including U.S.S.R. and other non-member countries of Eastern Europe. In the table, this asymmetry is assumed to remain constant at the projected 1983 level.

(i) Allowance was made for temporary (noncyclical) disturbances affecting the estimated current account position for 1983. In the present illustrative exercise the main factor taken into account was the import liberalization policies of Japan, which are to take effect during the second half of 1983 and which are therefore only partially reflected in the projected actual external payments figures for this year.

(ii) Since data on real exchange rates based on normalized unit labor costs are generally available only to the second quarter of 1983, real exchange rates were assumed to remain at their June 1983 levels. Adjustment was then made for the effects of past changes in exchange rates and relative prices on foreign trade flows that were still in the pipeline by the end of June 1983--that is, for effects that are not yet fully reflected in the 1983 trade flows, but which may be expected to exert an influence within a two to three year period. These estimates were obtained using the World Trade Model developed by the staff. 1/

(iii) The effects of projected changes in relative cyclical positions to 1986 were calculated on the basis of two alternative scenarios with respect to growth rates. Scenario I, corresponding to medium-term Scenario A in the published World Economic Outlook 1983, assumes that the average rate of growth of real GNP from 1983 to 1986 is 3 1/2 percent for the United States, 4 percent for Japan, 2 1/2 per cent for the Federal Republic of Germany, and 2 percent for the group of other industrial countries. Scenario II assumes average rates of growth which, relative to Scenario I, are half a percentage point higher for the United States, half a percentage point lower for Japan and the Federal Republic of Germany, and the same for the other industrial countries as a group. Estimates of the effects of projected changes in relative cyclical positions were also obtained from the World Trade Model.

(iv) Adjustment was made for medium-term tendencies that seem to be independent of considerations of price competitiveness. The adjustment was estimated by reference to the trend components of World Trade Model projections and on the basis of an ad hoc evaluation of tendencies on account of invisible flows.

In Table 3, column 1 presents the projected current account balance for 1983, while columns 2 to 5 give the adjustments that were made to arrive at the illustrative calculation of the underlying current account

1/ See Michael C. Deppler and Duncan Ripley, "The World Trade Model - Merchandise Flows," Staff Papers, 25, March 1977.

positions. ^{1/} Columns 6 and 7 are the estimates of the underlying current account balances (under scenarios I and II, respectively) excluding official transfers and columns 9 and 10 are the same figures inclusive of official transfers.

3. Assessing the sustainability of the underlying current account position

In order to determine whether an underlying current account balance estimated by steps (i)-(iv) is sustainable in the medium term at the given exchange rate, it is necessary to assess whether this flow is consistent with a "normal" level of net private capital flows and with a reasonable accumulation of (net) official foreign exchange reserves.

It is evident that projecting the sustainable and appropriate levels of these balance of payments flows is a very difficult task. A major role of capital movements is to contribute to a better allocation of world savings by promoting a tendency for the equalization of real rates of return on investment among countries. Many of the factors that lead to these private capital transfers are relatively stable or fluctuate with the economic cycle around stable longer-term trends. For example, propensities to save are usually stable, after adjustment for cyclical movements. Similarly, the geographic distribution of investment opportunities tends to be stable, particularly because it partly reflects basic factors related to income distribution and to the overall growth potential of various economies. To the extent that these factors remained stable over time, there would be an associated stable component in private capital movements. However, structural developments can certainly lead to a change in this component, and the change may be difficult to detect at an early stage because, in the short run, capital movements tend to be dominated by the effects of temporary variations in the relative expected yields on financial assets denominated in different currencies. Furthermore, as already noted in Section I, major changes in fiscal positions may also have implications for private capital flows.

In its work on the estimation of normal levels of private capital flows, the staff has tended to rely in some instances on information or targets provided by the national authorities, as for example in the case of the 1982 report on Sweden. In the many instances where this is not possible, the only alternative is to extrapolate past tendencies and to

^{1/} Although actual data are not available for developments in relative normalized unit labor costs during the second half of 1983, it is clear that the adjustments for relative price changes in column 3 would be significantly affected if they included the effects of exchange rate movements that have occurred since July.

adjust these extrapolations for known factors that may involve a change from past trends. This eclectic and judgmental method is obviously subject to a significant margin of uncertainty.

Chart 6 presents annual data on private capital flows (including errors and omissions) expressed as a percentage of GNP for 12 industrial countries over the years 1963 to 1982. For four of the major countries--France, the Federal Republic of Germany, Japan, and Canada--the capital account balance expressed as a percentage of GNP fluctuated around a relatively stable longer-term level during the period under consideration, with major deviations related to special events such as the breakdown of the Bretton Woods system in 1971-73 and the two waves of oil price increases in 1973-74 and 1979-80. For the first three of these countries the data suggest that, when averaged over a number of years, net private capital flows have been relatively small, both as a proportion of GNP and in absolute terms. In the case of Canada, net capital inflows tended to be significant throughout most of the period under consideration, possibly in part because of the close integration of its economy with that of the United States. For Japan, however, a break with the established trend may now be in prospect because the removal of controls on capital flows and the increased propensity of Japanese firms to invest abroad is leading to large capital outflows.

In the case of Norway and the United Kingdom in the 1970s (and the Netherlands in the late 1960s) large increases in capital flows appear to have been associated with the financing of major oil and gas projects. Capital flows for these countries were also influenced by temporary factors such as the U.K. authorities' attempt to resist the appreciation of the pound sterling in 1977, as well as structural factors such as the removal of controls on capital outflows in 1979. For other industrial countries such as Belgium, Denmark, Italy, the Netherlands, and Sweden, the data suggest a rising trend of capital inflows since the mid-1970s, associated in particular with a substantial increase in official or quasi-official borrowing.

Although the net private capital outflow from the United States including errors and omissions is small both as a proportion of GNP and in absolute terms, the net flow is the outcome of large flows in opposite directions. Identified private capital movements (exclusive of errors and omissions) have recorded a relatively stable net outflow of somewhat more than 1 percent of GNP over a long period. By contrast, the errors and omissions item itself has risen during the past five years from a negligible amount to an average of 1 percent of GNP in 1981-82.

This brief review of capital account developments suggests that, even though net capital flows tend to cumulate to relatively small amounts over a number of years in many cases, it is rather difficult

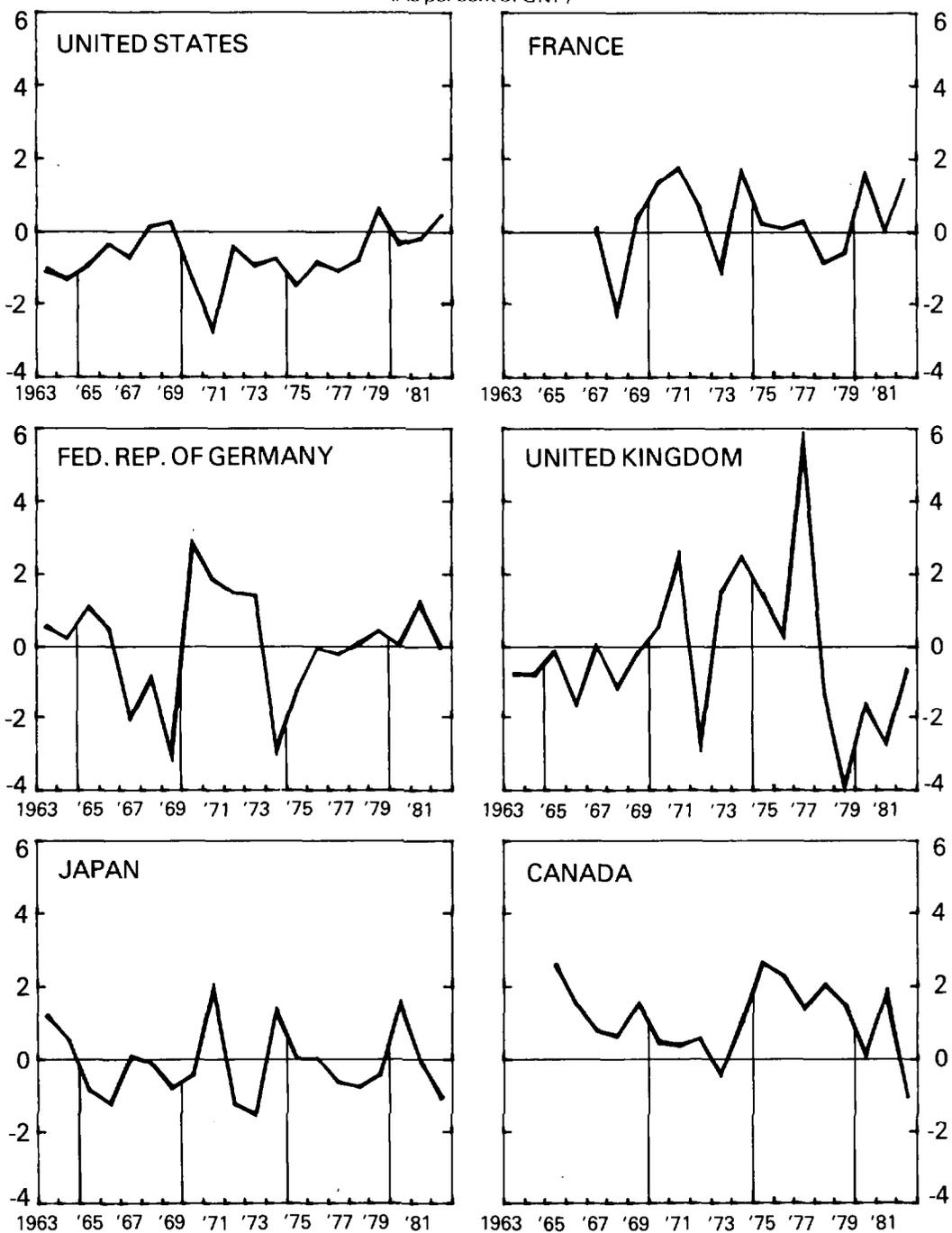
to come to a view as to the normal pattern of capital account balances for the industrial countries. To continue the illustration of the underlying payments balance approach, estimates of the normal levels of private capital flows were obtained by averaging the ratio of capital flows (including errors and omissions) to GNP for the period 1975-1982, excluding the years 1979 and 1980 (which are affected by the second oil price change) and scaling the results to 1982. ^{1/} For Japan, a special allowance was made for the effects of recent changes in capital controls and for increased direct investment outflows. The results appear to suggest an outflow on the order of \$5-10 billion for the United States and Japan, a roughly balanced position on capital account for the Federal Republic of Germany, and an inflow on the order of \$10-20 billion for the other industrial countries as a group.

The inherently large uncertainty in any attempt to project normal underlying positions on both the current and private capital accounts is of course greatly increased by the recent tendency toward a huge global asymmetry in the recording of balance of payments data. In the present illustrative exercise, errors and omissions have been included with capital flows, and the growth of industrial country receipts under this item in recent years has been interpreted as a decline in the magnitude of normal capital outflows from this group of countries. However, it is also possible that errors and omissions reflect a persistent flow (possibly related to current transactions) in some countries, and a temporary flow (perhaps associated with volatile financial flows) in others. In this case, the estimates cited above could easily give a biased impression of prospective underlying payments imbalances among major industrial countries. Moreover, the uncertainty is also greatly increased as a result of the medium-term evolution of fiscal positions, particularly in the United States. For example, if the U.S. fiscal deficit were to be about 6 percent of GNP over the next few years (rather than about 1 percent as it was during the 1960s and 1970s) and if only 20 percent of the additional deficit were to be financed through an

^{1/} For the United States, where the errors and omissions item is very large, this calculation was made in two steps. First the average ratio of capital flows excluding errors and omissions for the period 1975-78 and 1981-82 was applied to the figure for nominal GNP in 1982, to give an estimated outflow of \$38 billion. Then the average of the errors and omissions item in 1981 and 1982 (equivalent to an inflow of \$32 billion) was added to this figure to give a net outflow, including errors and omissions, of approximately \$6 billion. For other countries, the average ratio was simply applied to total capital flows including errors and omissions.

CHART 6
SELECTED INDUSTRIAL COUNTRIES:
CAPITAL ACCOUNT BALANCES¹, 1963-1982

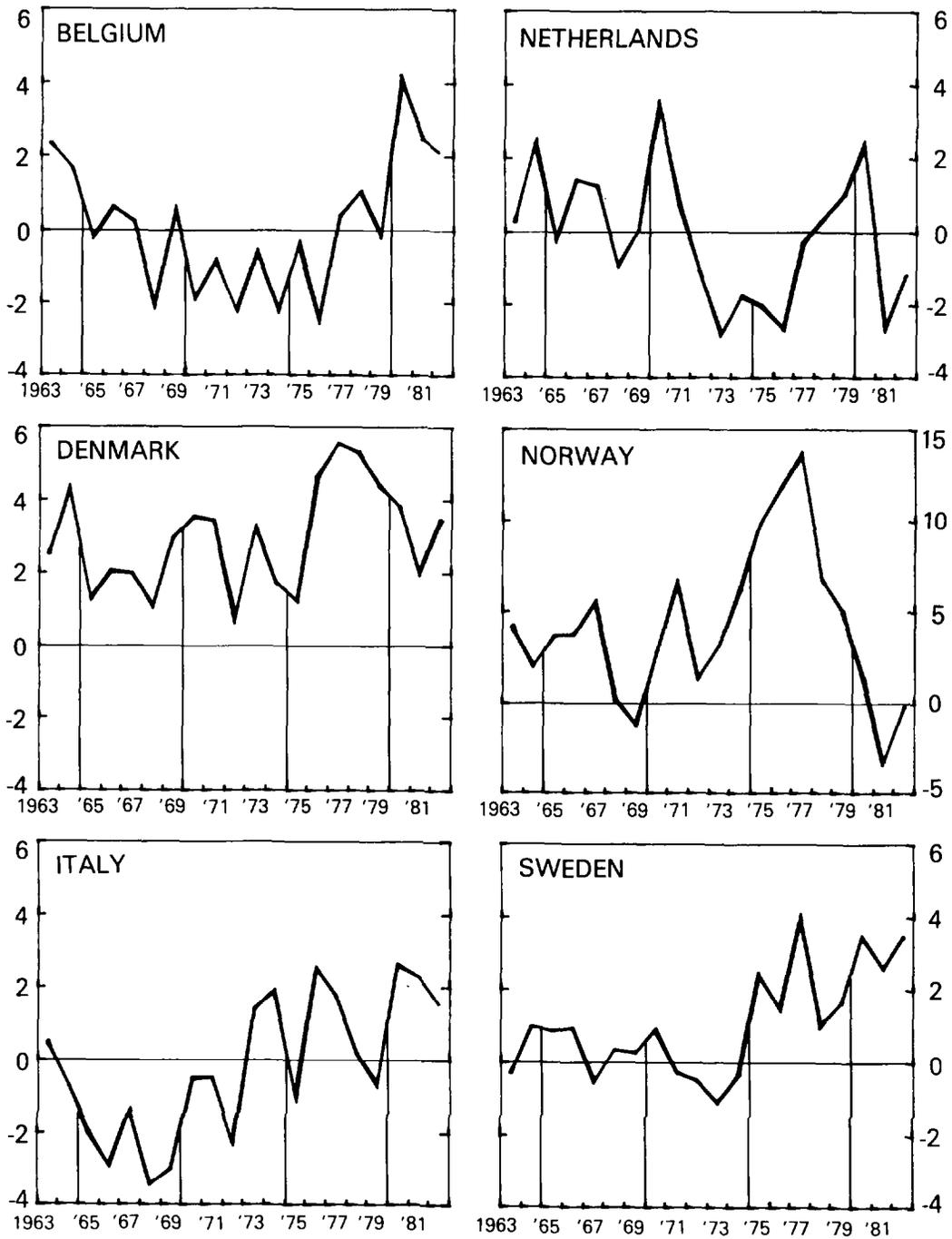
(As per cent of GNP)



Source: IMF, *International Financial Statistics*.
¹Including net errors and omissions.



CHART 6 (concluded)
SELECTED INDUSTRIAL COUNTRIES:
CAPITAL ACCOUNT BALANCES¹, 1963-1982
(As percent of GNP)



Source: IMF, *International Financial Statistics*.
¹Including net errors and omissions.



absorption of foreign savings, either directly or indirectly, this could change the 'normal' capital flows of the United States by some \$30 billion, with a roughly opposite effect on the normal private capital flows of other industrial countries. ^{1/} In this case, a large part of the previously projected imbalances between underlying payments positions on current account and the positions necessary to offset normal capital flows would disappear.

4. Reliability of estimates of underlying payments balances and sustainable exchange rates

In contrast to judgments of the sustainable exchange rate based on the competitiveness indices discussed in Section III, assessments based on underlying payments balance considerations are explicitly concerned with developments in both the current and capital accounts, and they allow for the impact of the stance of economic policies on the sustainable level of a country's exchange rate. Nevertheless, as already suggested above, the effort to take account of these considerations increases the complexity of the analysis on which exchange rate assessments are based. The remainder of this section considers the difficulties inherent in projecting underlying payments balances, the experience of past underlying payments exercises undertaken by the staff and, finally, the problems that arise in moving from these estimates to an assessment of the sustainable exchange rate.

The first technical issue that arises in estimating underlying payments balances is that of making allowance for the effects of past relative price changes on the underlying value of merchandise trade. For these purposes, the staff has made use of the World Trade Model. The most recent econometric estimates of the price elasticities of merchandise import and export volume in this model are presented in Table 4. In contrast to Table 3, which was intended to indicate the responsiveness of merchandise trade flows to the standard indicators of international competitiveness, the elasticities in Table 4 measure the direct responsiveness of merchandise trade to export and import prices. In order to give an idea of the extent to which merchandise trade flows respond to price changes with a lag, Table 4 presents both an "impact" elasticity for the response during the first six months, and a "long-run"

^{1/} Whether this opposite effect would be of the same magnitude is uncertain because part of the increase in the absorption of foreign savings by the United States could have as a counterpart a decrease in the absorption of foreign savings by the developing countries.

Table 4. World Trade Model: Relative Price Elasticities
for Trade in Manufactures ^{1/}

Country	Imports				Exports			
	Impact elasticity	Short-run elasticity	Long-run elasticity	95 Per cent confidence interval for long-run elasticity ^{2/}	Impact elasticity	Short-run elasticity	Long-run elasticity	95 Per cent confidence interval for long-run elasticity ^{2/}
Austria	-0.03	-0.36	-0.80 (1.24)	(0, -1.91)	-0.39	-0.71	-1.37 (6.28)	(0.92, 1.82)
Belgium	—	—	-0.70 (3.17)	(-1.15, -0.24)	-0.18	-0.59	-1.55 (3.09)	(0.52, 2.59)
Canada	-0.72	-0.72	-0.72 (4.18)	(-1.07, -0.36)	-0.08	-0.40	-0.71 (2.75)	(0.18, 1.24)
Denmark	-0.55	-0.93	-1.14 (2.08)	(-2.26, -0.01)	-0.82	-1.13	-1.13 (7.49)	(0.82, 1.44)
France	—	-0.49	-0.60 (3.39)	(-0.96, -0.23)	-0.20	-0.48	-1.25 (3.82)	(0.58, 1.92)
Fed. Rep. of Germany	-0.57	-0.77	-0.77 (6.75)	(-1.00, -0.53)	—	—	-1.41 (3.23)	(0.51, 2.32)
Italy	-0.94	-0.94	-0.94 (4.04)	(-1.42, -0.46)	—	-0.56	-0.64 (0.81)	(0, 1.98)
Japan	-0.16	-0.72	-0.97 (3.62)	(-1.52, -0.42)	-0.59	-1.01	-1.61 (6.46)	(1.1, 2.12)
Netherlands	-0.71	-1.22	-1.22 (2.84)	(-2.10, -0.33)	-0.24	-0.49	-0.89 (1.79)	(0, 1.73)
Norway	—	-0.01	-0.71 (1.17)	(0, -1.75)	-0.40	-0.74	-1.49 (5.22)	(0.90, 2.07)
Sweden	—	—	-0.94 (1.77)	(0, -1.85)	-0.27	-0.73	-1.59 (5.01)	(0.94, 2.25)
Switzerland	-0.25	-0.25	-0.25 (1.04)	(0, -0.66)	-0.28	-0.42	-0.73 (1.25)	(0, 1.74)
United Kingdom	-0.60	-0.75	-0.75 (3.59)	(-1.19, -0.32)	—	—	-0.31 (1.52)	(0, 0.65)
United States	—	-1.06	-1.06 (2.92)	(-1.79, -0.32)	-0.18	-0.48	-1.67 (8.07)	(1.24, 2.09)

^{1/} The impact elasticity gives the response in the current semester, the short-run elasticity gives the response after 2 semesters (1 year) and the long-run elasticity gives the total response. t values are given in parentheses.

^{2/} Given the estimated elasticity, there is a 95 per cent probability that the true elasticity lies within this range. In the cases where the range would have included values with the wrong sign, only an upper value is given.

elasticity which represents the total estimated response over a two- to three-year interval. The estimates presented in the table are plausible in the sense that all price effects operate in the expected direction, and all long-run elasticities are at least as large as impact elasticities. Nevertheless, the wide confidence intervals that apply to these estimates make it clear that it is very difficult to obtain accurate estimates of the effects of price developments on merchandise trade flows and of the time profile of these effects.

A second technical issue arises in attempting to take account of the effects of factors other than relative price developments on merchandise trade. In recent years of low growth rates the large gaps that have appeared between actual and potential output, together with uncertainties about such developments as the likely course of commodity prices and the influence of rigidities in goods and factor markets on economic activity have made it much more difficult to project cyclical developments in the industrial countries. Since changes in relative cyclical positions are major determinants of the pattern of observed current account balances among industrial economies, the problem of determining each country's underlying balance of payments position becomes especially complicated. The estimation of medium-term tendencies is even more unreliable. The assumption that recent historical trends will continue for the next two or three years is often questionable.

A third problem that tends to increase the degree of uncertainty associated with the projected current account position is that little quantitative information is available on the responsiveness of trade in invisibles to price developments or changes in relative cyclical positions among the industrial countries. ^{1/} As a result, the balance on invisibles must be projected on an ad hoc basis.

Finally, and most importantly, a significant margin of uncertainty arises in implementing the underlying payments balance approach because there is no unique pattern of current account balances among the industrial countries that is clearly superior to all others from an international standpoint. Even when it is possible to identify the normal levels of net capital flows for the various countries, one can reasonably assume that deviations from these normal levels would have to be quite sizable before they became a source of concern. Thus, in addition to the margin of error arising from imperfect knowledge of important parameters such as the price elasticities of supply and demand in foreign trade, there is an inherent margin of uncertainty in the calculations.

^{1/} See Bond, M., "The World Trade Model: Invisible Flows" (DM/78/99), Staff Papers, June 1979.

An impression of the overall reliability of past estimates of the pattern of underlying current account positions can be obtained by examining the track record of the calculations that were made for the United States, the Federal Republic of Germany, Japan, and the other industrial countries (taken as a group) during the period from 1977 to 1980. ^{1/} Table 5 presents three sets of calculations made, respectively, in February 1976, August 1978, and March 1980. These three sets were selected so as to span the whole period considered. For each exercise, the table indicates the date of the study, the date at which the real exchange rate was "frozen," and the base year used for the current account calculations. For example the first study, which was issued in February of 1976, considered underlying balances corresponding to average real exchange rates in 1975, and used preliminary estimates of actual current account balances in 1975 as the basis for the calculations. By implication, the pattern of underlying current account balances can be viewed as an important component in the assessment of the sustainability of the assumed exchange rates. Conclusions as to sustainability can be reached only by comparing the pattern of underlying current account balances with the estimated pattern of normal capital flows. Estimates of normal capital flows were not included in each study, but for present purposes it is enough to know that the United States was viewed as having a larger normal capital outflow than either the Federal Republic of Germany or Japan. This larger outflow warranted a larger current account surplus, say on the order of \$5 billion to \$10 billion.

Staff estimates made in February 1976 on the basis of the average exchange rates for 1975 suggested that there was an imbalance in the pattern of underlying current account positions among industrial countries. The underlying current account position of the United States was projected to be reasonable, given that its normal capital outflow was judged to be at least \$5 billion. However given the relatively small assumed normal capital outflow for the Federal Republic of Germany, its current account position appeared to be stronger than was warranted by underlying factors, while the position of Japan--based on similar considerations--appeared to be too weak. With the benefit of hindsight (see, in particular, the data on exchange rates depicted in Chart 2, pp. 26a-b) the staff would now consider that it gauged the positions of the United States and the Federal Republic of Germany about right,

^{1/} Estimates for each of the other four major industrial countries were also made and can be obtained from the studies referred to in Table 5.

Table 5. United States, Federal Republic of Germany, and Japan:
Estimates of Actual and Underlying Current Account Positions 1/

(In billions of U.S. dollars)

<u>Date of Study</u>	<u>Feb. 1976</u>	<u>Sept. 1978</u>	<u>March 1980</u>
Exchange Rate frozen as of:	<u>1975</u>	<u>Aug. 1978</u>	<u>March 1980</u>
Base year	1975	1977	1979
United States			
Actual as estimated in study	10.3	-15.3	-0.3
Estimated underlying	4.3	-1.6	4.0
Federal Republic of Germany			
Actual as estimated in study	5.5	3.7	-4.9
Estimated underlying	5.0	1.3	-10.0
Japan			
Actual as estimated in study	-0.4	10.9	-8.6
Estimated underlying	-9.2	-0.7	-8.5
Other industrial countries			
Actual as estimated in study	-10.1	-15.2	-12.5
Estimated underlying	-15.1	6.1	-3.0
Total industrial countries			
Actual as estimated in study	5.3	-15.9	-26.3
Estimated underlying	-15.0	5.1	-17.5
Source of estimates	SM/76/32 Tables 1 & 4	ID/78/5 Table 7	ID/80/3 Table 7

1/ Including official transfers.

but that it over-estimated the weakness of Japan's underlying position. Indeed, just a year later, the yen started to appreciate sharply in real terms as the Japanese current account balance strengthened considerably.

Staff estimates made in September 1978 showed that the underlying current account position of the United States was much stronger than the actual data suggested. Nevertheless, the underlying position was not so strong when compared with the size of normal capital outflows from the United States and with the underlying positions of the Federal Republic of Germany and Japan. On balance, the results suggested that the sharp deterioration of the U.S. dollar in the period following August 1978 was not fully justified by underlying economic and financial conditions. Similarly, the calculations made in March 1980 suggested that the depreciation of the U.S. dollar vis-à-vis the deutsche mark and the yen had gone too far.

Once the imbalance in the pattern of current account positions of industrial countries has been estimated on the basis of current exchange rates by comparing the present underlying current account positions of the various countries with their normal capital account balances, the last step is to calculate the deviations of actual exchange rates from their sustainable levels by estimating the change in exchange rates that would bring about the needed current account adjustments. The two formal economic models available to the staff for making such calculations are the World Trade Model and the Multilateral Exchange Rate Model. As already noted, the World Trade Model is an econometric model that provides estimated values for trade price elasticities. In contrast, the Multilateral Exchange Rate Model (MERM) is a mathematical simulation model in which direct and cross-price elasticities in the goods markets for each commodity category in each country are generated from a few "basic" parameters chosen from various econometric studies.

In practice, a major difficulty in using these models for calculating the sustainable exchange rate, as already noted earlier, is that estimates of the price elasticities of exports and imports may not be sufficiently reliable to undertake this task with a high degree of confidence. Referring again to the World Trade Model's estimated elasticities in Table 4, it is clear that even the cumulative long-run elasticities are subject to a substantial margin of error, as reflected in the "confidence intervals" in columns 4 and 8.

Broadly speaking, similar conclusions apply to the empirical estimates of price elasticities of demand for imports and exports that are available in the academic literature. The most recent survey of this

work undertaken by members of the Fund staff supports the widely-held view that the long-run (i.e., two- to three-year) price elasticity of import demand for a typical industrial country lies in or above the range -0.5 to -1.0. ^{1/} For the price elasticity of demand for exports, this survey gives a 'consensus estimate' of -1.25 to -2.5. As Table 6 indicates, however, the ten recent empirical studies that were surveyed in the staff's study yield quite a wide range of estimated medium-term trade-price elasticities for each industrial country. The reasons for this lack of unanimity in the estimates probably lie in the poor quality of statistical information on foreign trade prices, the difficulty of distinguishing between price effects and non price factors such as quality, delivery dates, "after-sales service," development of new products, and aggregation bias.

The major sources of uncertainty in the calculations made by the staff during the 1970s arose in assessing the implications of underlying payments imbalances for movements in exchange rates. For example, in 1971 the staff's calculations suggested that the projected imbalances among the three largest countries implied that exchange rates (in terms of the U.S. dollar) were out of line with what was justified by underlying economic and financial factors by about 15 to 20 percent for the yen and 10 to 15 percent for the deutsche mark. In the event, the yen appreciated in real terms against the dollar by about 40 percent (on the basis of normalized unit labor costs) from its parity level in 1971 to its average level in 1974-77, while, on the same basis, the deutsche mark appreciated by about 47 percent. Similarly, in early 1980 the staff's calculations suggested that the projected imbalances would be consistent with depreciations of the deutsche mark and yen vis-à-vis the U.S. dollar of possibly 10 percent. While the yen depreciated in real terms vis-à-vis the U.S. dollar by about 10 percent between early 1980 and the first half of 1983, the deutsche mark depreciated by 37 percent over the same period. Of course, these actual movements in exchange rates, both from 1971 to 1974-77 and from early 1980 to the first half of 1983, may have been due in part to overshooting, but it seems doubtful that all of the discrepancy can be blamed on such short-run financial effects.

5. Summary

Assessments of a country's sustainable exchange rate based on its projected medium-term overall payments position have the advantage that they attempt to allow for a comprehensive set of factors that influence

^{1/} See M. Goldstein and M.S. Khan, "Income and Price Effects in Foreign Trade" (DM/82/61, 9/20/82).

Table 6. Long-Run Price Elasticities of Demand for Total Exports and Imports: Representative Estimates from Recent Empirical Studies

	Long-run elasticity of demand for total exports			Long-run elasticity of demand for total imports		
	Lowest estimate	Highest estimate	Range of estimates	Lowest estimate	Highest estimate	Range of estimates
Austria	-0.93	-1.21	0.28	-0.82	-1.42	0.60
Belgium	-0.84	-1.57	0.73	-0.48	-2.90	2.42
Canada	-0.23	-1.10	0.87	-0.20	-2.50	2.30
Denmark	-0.56	-1.28	0.72	-0.23	-1.66	1.43
France	-0.34	-2.27	1.93	-0.33	-1.80	1.47
Germany	-0.29	-1.90	1.61	-0.24	-1.48	1.24
Italy	-0.25	-3.29	3.04	-0.13	-1.42	1.29
Japan	-0.50	-2.38	1.88	-0.72	-1.47	0.75
Netherlands	-0.88	-2.72	1.84	-0.02	-1.65	1.63
Norway	-0.80	-1.16	0.36	-1.19	-1.20	0.01
Sweden	-0.47	-1.99	1.52	-0.76	-1.30	0.54
Switzerland	-0.58	-1.51	0.93	-0.84	-1.35	0.51
United Kingdom	-0.08	-1.47	1.39	-0.21	-1.38	1.17
United States	-0.32	-2.32	2.00	-1.03	-1.73	0.70
Mean	-0.51	-1.87	1.36	-0.51	-1.66	1.15
Median	-0.49	-1.74	1.46	-0.41	-1.48	1.21

Source: M. Goldstein and M.S. Khan, "Income and Price Effects in Foreign Trade," IMF (DM/82/61, 9/20/82), p. 33.

the current and capital accounts of the balance of payments. In particular, they make explicit allowance for the effects of policy stances and cyclical positions. While such an approach encounters substantial difficulties, the effort to assess underlying payments balances in a multilateral framework helps to ensure some degree of consistency across countries in the judgments that are made about the set of sustainable exchange rates for industrial countries.

V. Concluding Remarks

This paper has reviewed the elements that are normally taken into account in assessing the sustainability of industrial countries' exchange rates. It is evident from the discussion of the preceding sections that it is a difficult matter to arrive at judgments about the exchange rate levels that are sustainable from the standpoint of the Fund's surveillance duties.

The assessment of what constitutes a sustainable exchange rate may take a number of distinct elements into account. In this context, Section II concluded that although the analysis of disturbances in financial markets is helpful in obtaining an impression of the role of overshooting in the movements of market-determined exchange rates, it is of only limited use in indicating the level of the rate that would be consistent with a sustainable pattern for the overall payments balance in the medium term. Section III discussed assessments of the sustainable exchange rate that emphasize considerations of international competitiveness in the goods market, indicating both their usefulness and their limitations. Section IV described how a more comprehensive assessment based on underlying payments balance considerations is arrived at.

Although indicators of competitiveness and of underlying payments positions are complementary elements in the assessment of sustainable exchange rates, the latter indicator, being more comprehensive, has several advantages as a basis for such judgments. In particular, it attempts to take account of developments in international capital markets and of the effects of factors other than relative prices on both the current and capital accounts of the balance of payments. In addition, underlying balance considerations also take explicit account of the overall policy stance of national authorities. Thus they help to give a measure of international consistency to assessments of external payments positions and sustainable exchange rates among member countries. In this way, they highlight the importance of the broad issues of Fund surveillance that were alluded to in the introduction to the paper.

It is also clear from the discussion of the preceding sections that there is an inherent margin of uncertainty in judgments of the sustainable exchange rate. At the technical level the main sources of uncertainty, as indicated in Sections III and IV, include: (1) the margin of error in the various statistical indices of the real effective exchange rate; (2) the limited confidence that can be attached to estimates of cyclical effects and past price changes in making projections of underlying payments balances; (3) the difficulty of estimating the likely effects of an underlying change in comparative advantage (e.g., the discovery of North Sea oil) on the sustainable level of a country's real exchange rate; (4) the sensitivity of estimates of sustainable exchange rates to assumptions concerning price elasticities in international trade; and (5) the substantial difficulties inherent in any attempt to judge the normal level of capital flows. In this context, it is again relevant to emphasize that a major uncertainty arises in connection with the very large asymmetry that is now evident in the global data on current account balances for the various groups of countries.

In addition to the uncertainties that exist at the technical level, serious issues also arise in attempting to assess the set of industrial country exchange rates that would be sustainable in the sense that they would yield an appropriate pattern of payments balances when viewed from an international perspective. As already noted in the preceding section, there is an inherent margin of uncertainty in such assessments, owing to the fact that there is no unique pattern of current account balances that is clearly superior to all others from an international standpoint.

Given these uncertainties, it is clear that the considerations described in this paper can only be expected to yield an approximate range for the sustainable exchange rate of each member country, rather than a precise level. However, the lack of precision in such assessments should not be overemphasized. In the case of countries that peg their currencies, the need is essentially to produce a rough yardstick that will assist the authorities in choosing a reasonable exchange rate, and to recognize when it is becoming over- or undervalued by a substantial margin. In the case of countries that leave the determination of their exchange rate to the free play of market forces, there is a need for a yardstick that will signal situations where market forces have pushed the current rate widely out of line with the value that would be sustainable in the medium term.

In performing its surveillance functions, the Fund is essentially concerned with the issue of whether each member country's exchange rate policies are appropriate from an explicitly multilateral standpoint. Thus, the Fund must reach judgments about the appropriateness of the exchange rates of all of its members in a consistent manner, while watching in particular for possible conflicts among these members. This requirement implies that the Fund must think in terms of an internationally consistent set of exchange rate ranges for member countries. In the staff's view, the approaches to exchange rate assessment that have been outlined in this paper go a substantial way toward providing a rough yardstick for doing this in the case of industrial countries, whatever their exchange arrangements. This does not mean that the staff's assessment of the divergence between the actual exchange rate and the sustainable rate will be equally well-defined in all surveillance cases. In some instances, the various considerations may all point toward the same conclusion, and the staff (as well as others) will therefore be able to put forward its assessment with some confidence. In other cases, the various elements in the overall assessment may conflict, and the magnitude of technical and policy uncertainties will be so large that the staff will need to be considerably more cautious in drawing a conclusion on the appropriateness of the current exchange rate. Even in the latter case, however, a discussion of why there is no consensus on the appropriateness of the current rate can be extremely useful. In any event, given the importance of the structure of exchange rates for the operation of the world economy, there is no real alternative but to try to improve existing methods so as to narrow over time the scope and size of current impediments to effective surveillance over exchange rates. Thus the staff will continue to develop and refine the methods described in this paper on the basis of research undertaken both within the Fund and elsewhere.

