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EBS/84/64

CONFIDENTIAL

March 21, 1984

To: Members of the Executive Board  
From: The Secretary  
Subject: Indicators of Real Effective Exchange Rates

There is attached for the information of Executive Directors the latest paper in the quarterly series presenting indicators of real effective exchange rates of member countries.

Att: (1)

INTERNATIONAL MONETARY FUND

Indicators of Real Effective Exchange Rates

Prepared by the Research Department  
(In consultation with the Exchange and Trade Relations  
Department, Area Departments, and the Bureau of Statistics)

Approved by Wm. C. Hood

March 20, 1983

This paper presents quarterly data on indicators of real effective exchange rates for member countries in the form of charts and tables. Real effective exchange rates are defined as nominal effective exchange rates adjusted for movements in relative local currency prices. The period covered extends over several years in order to permit examination of changes in a medium-term perspective.

There are various concepts of the real effective exchange rate corresponding to different analytical purposes. For example, one may be interested in an index of the real effective exchange rate in order to assess the international competitiveness of particular industries, the export sector as a whole, or the import-competing sector. Each specific purpose leads to a different method of calculation and a different result. In this paper, the focus is on the overall international cost and price competitiveness of each country. Each real exchange rate indicator is defined in such a way that an increase in its level indicates a loss in overall cost and price competitiveness.

Although indicators of a country's overall cost and price competitiveness are a useful input in the analysis of its overall balance of payments position, it must be borne in mind that many other factors in both goods and capital markets are also important determinants. Thus, a change in the real effective exchange rate is not per se a sign that the exchange rate is becoming inappropriate. Nor is a lack of change a sign that it continues to be appropriate; the evolution of the real effective exchange rate has to be interpreted in the context of other economic developments. In addition, there are many statistical and conceptual problems involved in the calculation of these variables. <sup>1/</sup> In the present context, it was decided to use

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<sup>1/</sup> A review of the conceptual problems that arise in the measurement of real effective exchange rates is presented in Edouard B. Maciejewski, "Real" Effective Exchange Rate Indices: A Re-Examination of the Major Conceptual and Methodological Issues," IMF Staff Papers, Vol. 30 (Sept. 1983).

readily available cost and price indicators and relatively simple weighting schemes so that the calculations could be made easily and consistently for a large number of member countries.

Three indices are presented. The first index, calculated for 14 industrial countries, is based on one of the indicators of competitiveness in manufacturing already published in International Financial Statistics (IFS). Out of the five indicators in IFS, that for relative normalized unit labor costs adjusted for exchange rate changes was selected as the most reliable one for the purpose at hand. This indicator is subject to errors in the estimation of the cyclically-adjusted rate of growth of output per manhour, but as long as the period considered is confined to a few years, the size of possible errors remains moderate. Its weighting scheme has the advantage of being built up from disaggregated trade data for manufactures, with the weights reflecting both the relative importance of a country's trading partners in its direct bilateral trade relations and that resulting from competition in third markets. Since the data on unit labor costs generally become available only after a considerable lag, estimates of the indicators of real effective exchange rates for recent periods must generally be obtained by using staff estimates of changes in unit labor costs for the most recent months, combined with actual data on exchange rates.

The second index is calculated for 36 countries in which the share of manufactures in total production and exports is sizable and for which the relevant data are readily available. This group includes all those classified in the World Economic Outlook as industrial countries except Luxembourg (i.e., the preceding 14 countries plus Australia, Finland, Iceland, Ireland, New Zealand, Spain) as well as those listed as "developing countries that are major exporters of manufactures," plus India, Hungary, Pakistan, Thailand, Philippines, and Malaysia. For this second calculation, the real effective exchange rate is based on consumer price indices and weights that reflect the geographical pattern of total imports and exports. <sup>1/</sup> Consumer price indices have the advantage of being relatively timely and easy to obtain, but they have the major disadvantage of being of only limited reliability as an indicator of a country's international cost and price competitiveness for a number of reasons, particularly because of the large weights often given to nontraded goods and to goods that are subsidized or subject to price controls. The weighting scheme for each country considered takes into account the relative importance of its bilateral trade with the other 35 countries, as well as competition in third markets; it suffers from the weakness of being based on aggregate trade flows, thus ignoring the greater degree of competition among certain countries that results from similarities in

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<sup>1/</sup> For India, use is made of the wholesale price index, which is considered as better suited to the present exercise; for Brazil a composite index of wholesale and retail prices is used.

their structures of production. However, this weakness is lessened somewhat by the fact that most of the countries included are mainly exporters of manufactures.

Finally, the third index applies to countries that are mainly producers and exporters of primary commodities. For this group, the real effective exchange rate is also based on the use of consumer price indices and weights that reflect aggregate trade flows. However, only bilateral trade flows between each country in this group and the previous group of 36 countries are taken into account. That is, the real effective exchange rate index for each country in the third group is calculated by weighting its bilateral real exchange rates with countries in the group of 36 on the basis of the relative sizes of its bilateral trade flows (imports plus exports) with these latter countries. To alleviate one of the weaknesses of this weighting scheme, oil exports have been excluded from the trade data used to derive the weights, since changes in real effective exchange rates have very limited relevance for the volume of oil exports. Also, since the weights for this group are based on their bilateral trade with the earlier group of 36 countries, imports of energy products by countries in the third group are effectively excluded from the weighting scheme. Other adjustments have been made on an ad hoc basis for a number of countries. One of the main remaining weaknesses of the weighting scheme used for this group is that it ignores the competition among suppliers of specific primary products.

Although the third group totals 112 member countries in all, there are a number of the countries for which the real effective exchange rate cannot be calculated, owing to the lack of reliable price data; in these cases calculation is confined to the nominal effective exchange rate.<sup>1/</sup> The usefulness of this nominal effective exchange rate is very limited because of the marked differences in inflation rates among countries. It is hoped that real effective exchange rate indices can eventually be developed for all Fund members.

The attached charts present the results for a selection of 55 industrial and developing countries. The tables that follow present the estimates for all countries, flagging changes in the indicators of real effective exchange rates that are particularly large in a medium-term perspective. The indicators are the same as those used by the staff in the system of information notices on large changes in real effective exchange rates (see EBS/83/138, 7/6/83), except that in the present report the base period of the indicators has been chosen as 1978--the last year before the second wave of oil price increases, the major rise

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<sup>1/</sup> There are 31 countries for which only the nominal effective exchange rate could be calculated (see Appendix); for three member countries (Afghanistan, Bhutan and Kampuchea) neither the nominal nor the real effective exchange rate could be calculated.

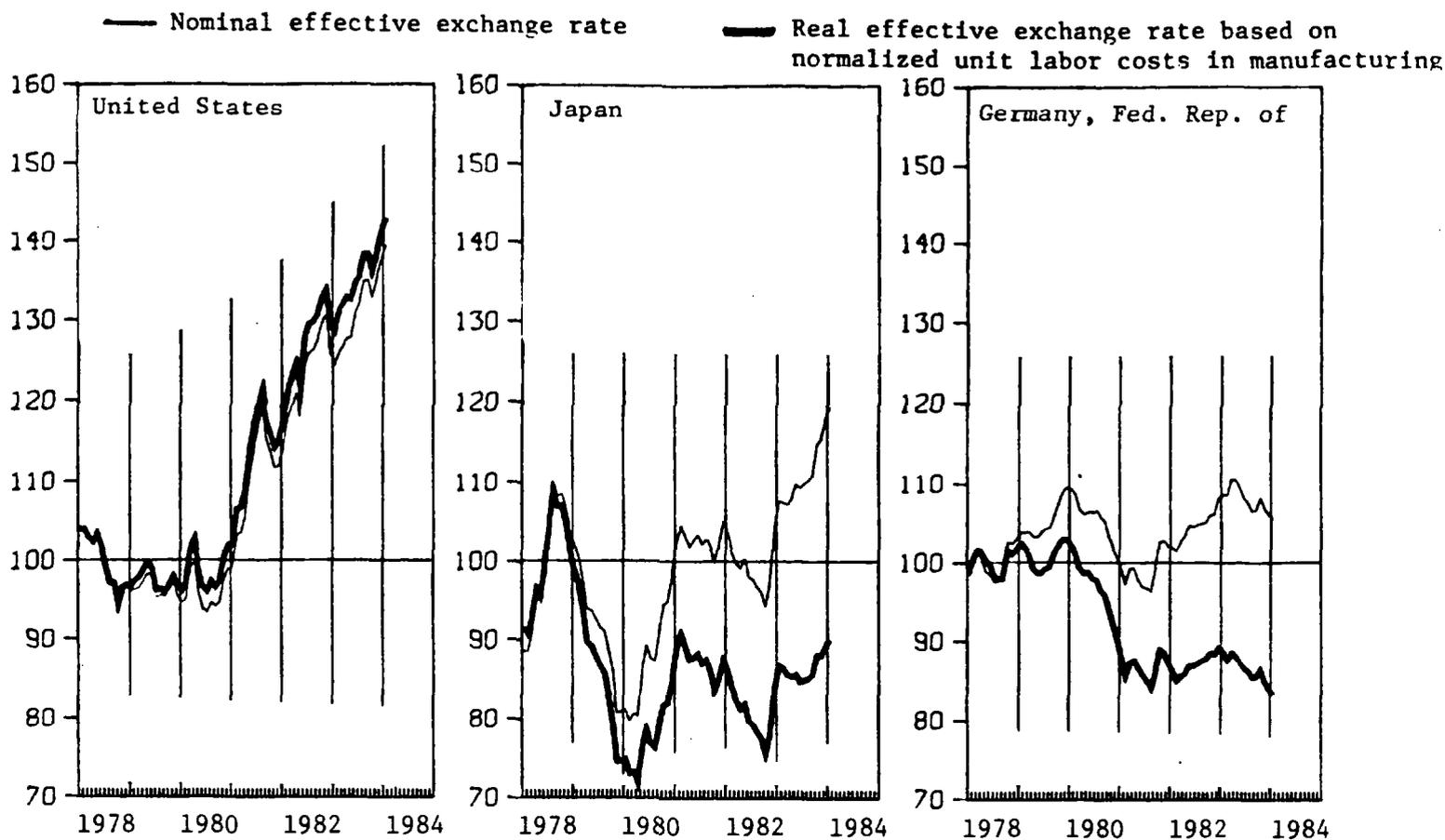
in interest rates, and the recession in industrial countries. The changes that are flagged are those that exceed 20 per cent from the 1978 base period. A description of the formulas and statistical data and a listing of the countries for which each index is calculated are given in the appendix.

\* \* \*

The staff will continue to examine the data and will refine the indices as experience is gained. It will also continue to seek improvement in the data in the course of its normal consultations with members.

## FOURTEEN INDUSTRIAL COUNTRIES: NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)



Change in Real Effective Exchange Rate <sup>1/</sup>  
(In percent)

Terminal Period	United States				Japan				Germany, Fed. Rep. of			
	Initial period		Initial period		Initial period		Initial period		Initial period		Initial period	
	1978	1980	1982	Q3 80	1978	1980	1982	Q1 81	1978	1980	1982	Q4 79
1979	-2.5				-13.3				0.8			
1980	-1.4				-22.6				-3.0			
1982	26.8	28.7			-19.4	4.1			-12.9	-10.2		
Jul-Dec'83	38.1	40.1	8.9		-13.1	12.3	7.8		-14.6	-12.0	-2.0	
Jan '84	43.1	45.2	12.8	48.0	-9.8	16.5	11.9	0.6	-16.8	-14.3	-4.6	-19.1

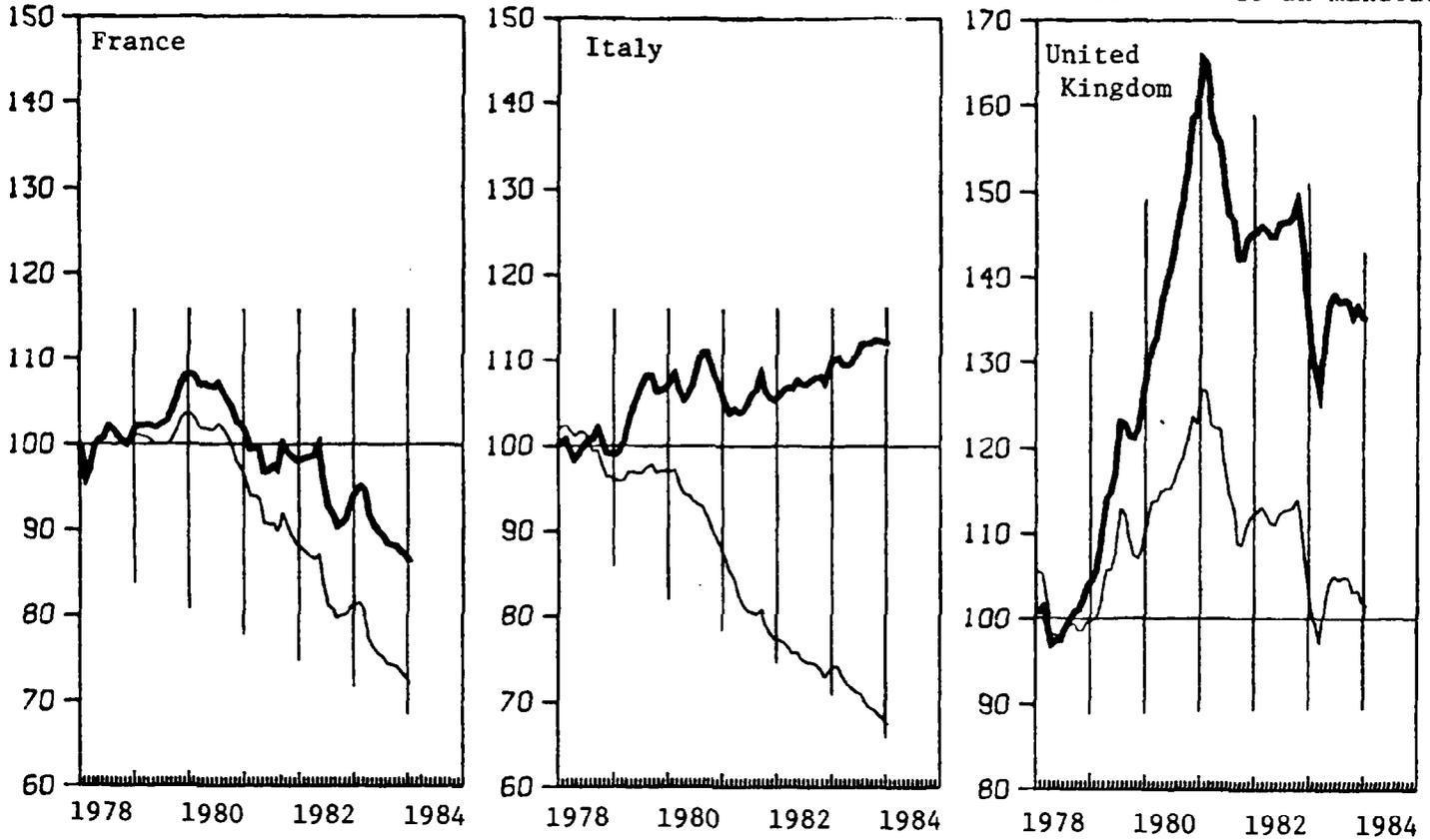
<sup>1/</sup> For each terminal period shown in the stub, the table indicates the percentage changes in the real effective exchange rate from the four base periods indicated in the heading. The fourth base period corresponds to the last major peak or trough, and differs from country to country. All the data refer to period averages.



## FOURTEEN INDUSTRIAL COUNTRIES: NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate
— Real effective exchange rate based on normalized unit labor costs in manufacturing



Change in Real Effective Exchange Rate  
(In percent)

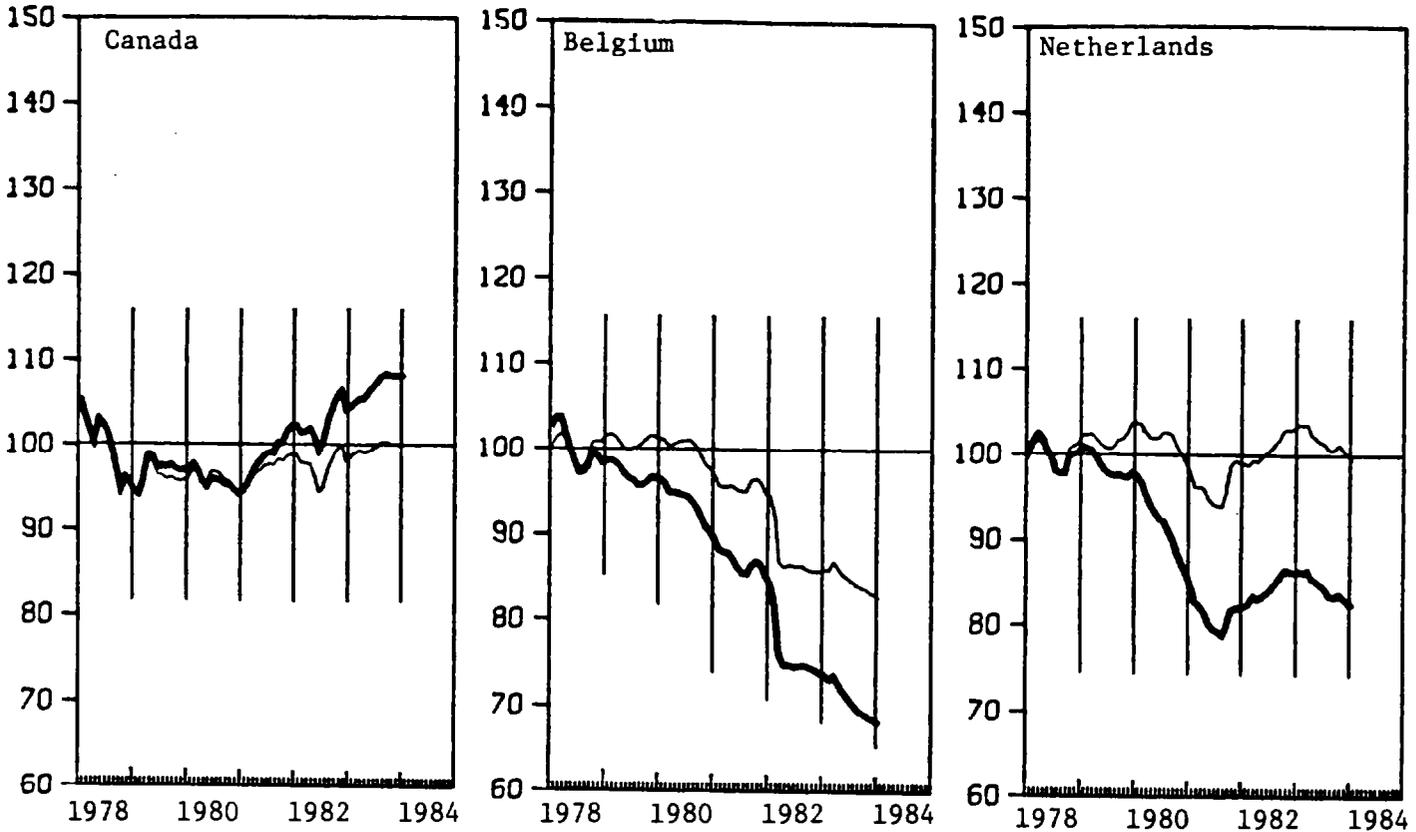
Terminal Period	France				Italy				United Kingdom			
	Initial period				Initial period				Initial period			
	1978	1980	1982	01 80	1978	1980	1982	03 80	1978	1980	1982	01 81
1979	3.6				4.6				16.8			
1980	5.8				7.9				43.4			
1982	-5.0	-10.3			7.3	-0.6			45.3	1.3		
Jul-Dec '83	-12.0	-16.9	-7.4		12.2	3.9	4.5		36.4	-4.9	-6.2	
Jan '84	-13.9	-18.7	-9.4	-19.9	12.0	3.7	4.3	1.5	34.9	-5.9	-7.2	-17.2



## FOURTEEN INDUSTRIAL COUNTRIES: NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate
— Real effective exchange rate based on normalized unit labor costs in manufacturing



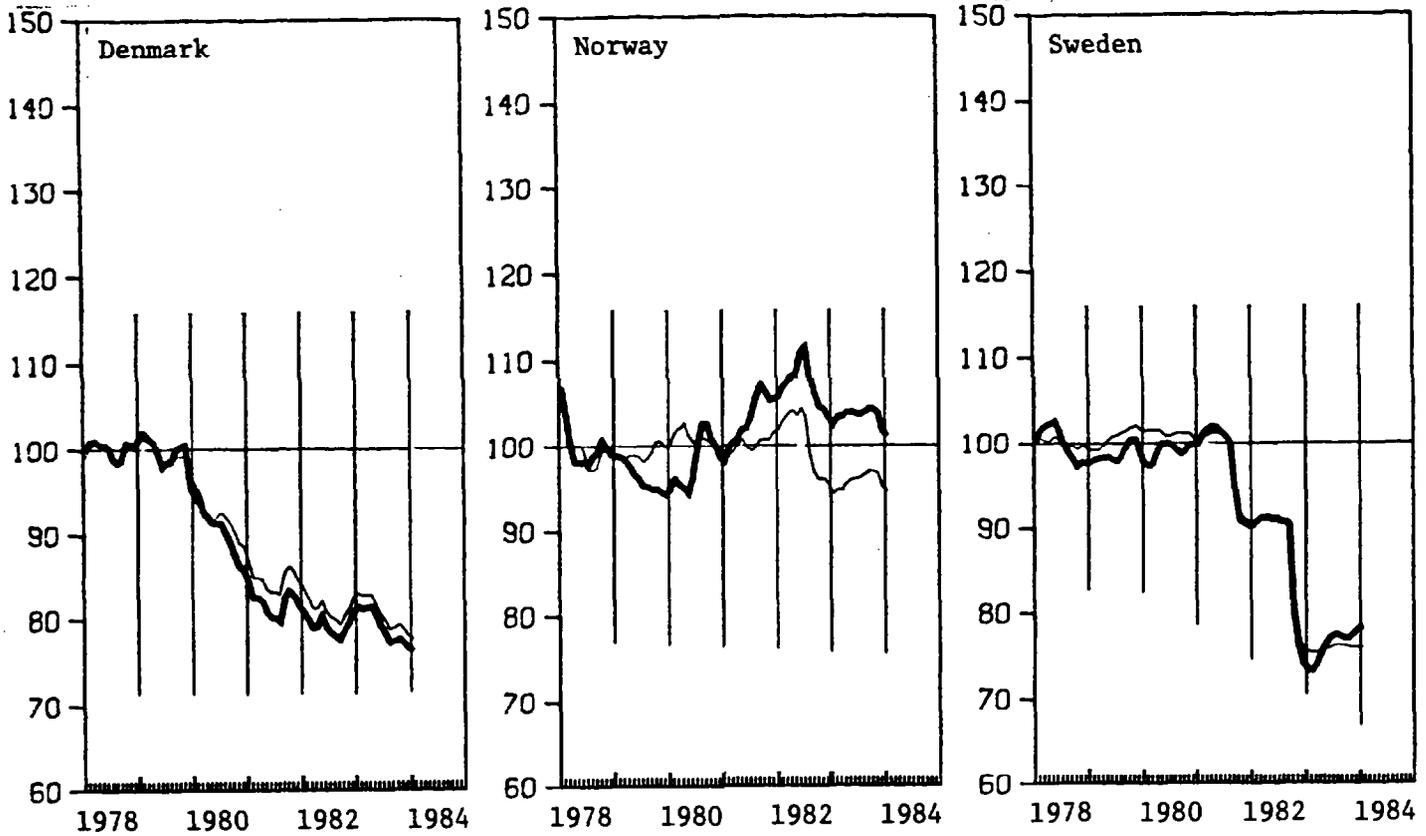
Change in Real Effective Exchange Rate  
(In percent)

Terminal Period	Canada				Belgium				Netherlands			
	Initial period				Initial period				Initial period			
	1978	1980	1982	Q4 80	1978	1980	1982	Q4 79	1978	1980	1982	Q4 79
1979	-3.1				-3.0				-1.3			
1980	-4.2				-6.2				-8.1			
1982	2.6	7.1			-24.0	-19.0			-15.6	-8.2		
Jul-Dec '83	8.0	12.7	5.3		-30.8	-26.2	-8.9		-16.6	-9.3	-1.2	
Jan '84	8.4	13.1	5.7	14.4	-32.1	-27.6	-10.6	-29.7	-17.9	-10.7	-2.6	-15.8



**FOURTEEN INDUSTRIAL COUNTRIES:  
NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984**  
(Index 1978 = 100)

— Nominal effective exchange rate      — Real effective exchange rate based on normalized unit labor costs in manufacturing



Change in Real Effective Exchange Rate  
(In percent)

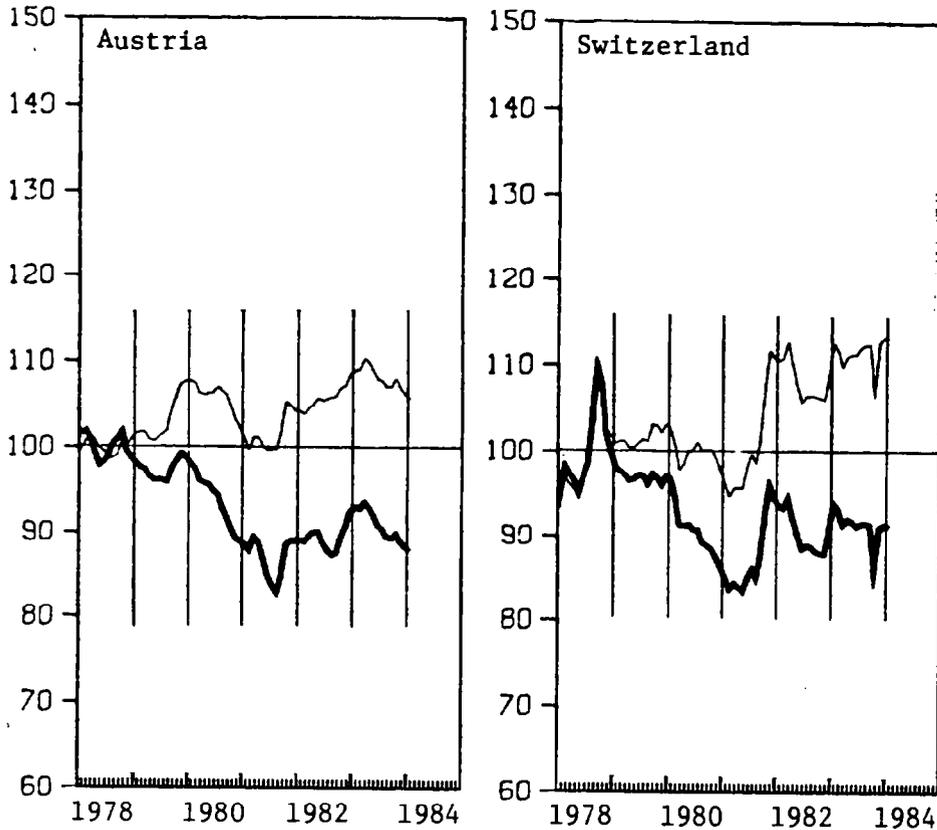
Terminal Period	Denmark				Norway				Sweden			
	Initial period		Initial period		Initial period		Initial period		Initial period		Initial period	
	1978	1980	1982	04 79	1978	1980	1982	02 82	1978	1980	1982	02 81
1979	-0.2				-3.8				-1.3			
1980	-9.4				-1.9				-1.0			
1982	-20.7	-12.5			7.0	9.1			-12.8	-11.9		
Jul-Dec '83	-22.7	-14.6	-2.4		3.5	5.5	-3.3		-22.6	-21.8	-11.3	
Jan '84	-23.9	-16.0	-4.0	-23.3	1.0	3.0	-5.6	-7.4	-21.6	-20.7	-10.0	-22.8



## FOURTEEN INDUSTRIAL COUNTRIES: NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate      — Real effective exchange rate based on normalized unit labor costs in manufacturing



Change in Real Effective Exchange Rate  
(In percent)

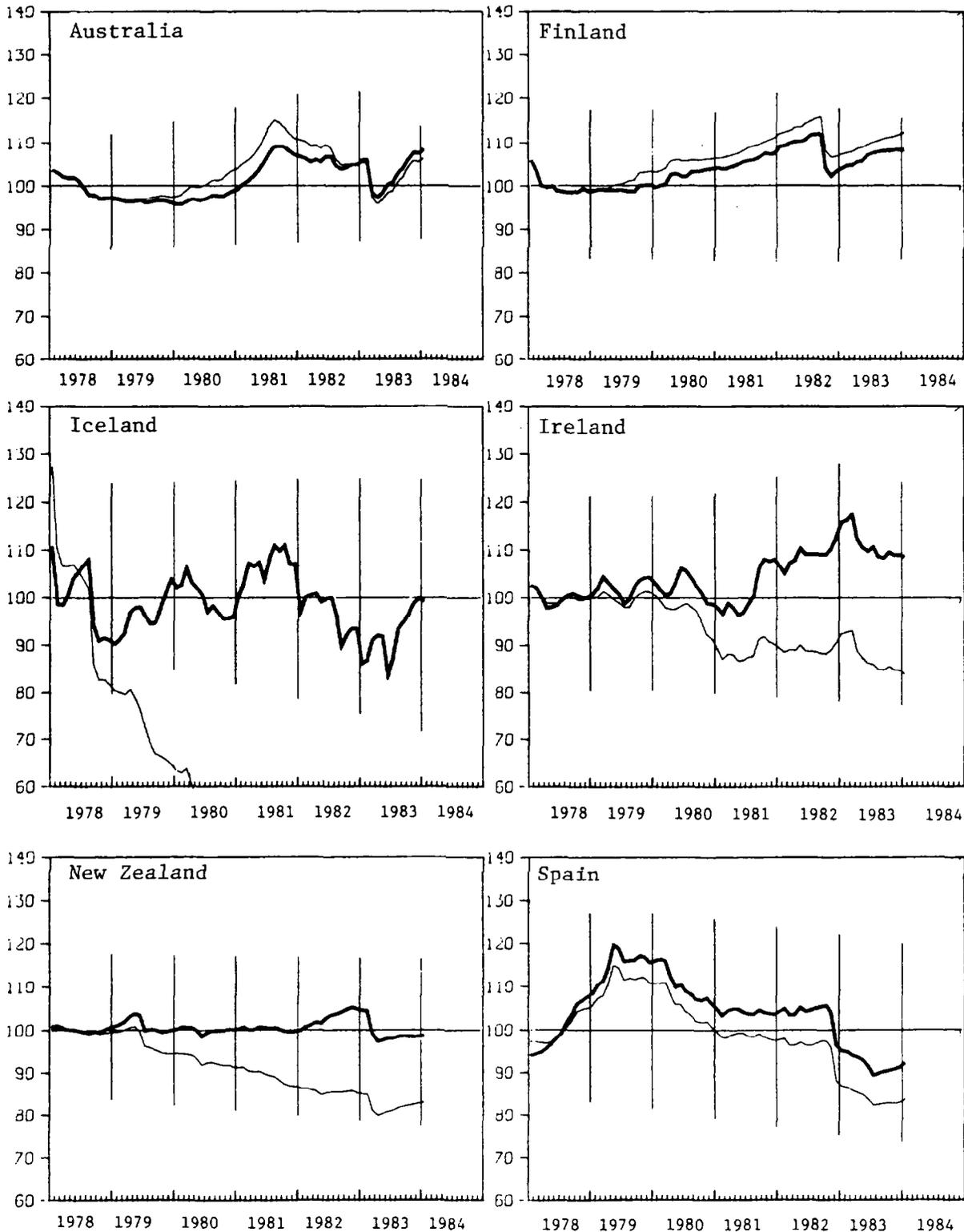
Terminal Period	Austria				Switzerland			
	Initial period		Initial period		Initial period		Initial period	
	1978	1980	1982	04 79	1978	1980	1982	02 81
1979	-2.7				-3.1			
1980	-6.3				-9.5			
1982	-10.7	-4.7			-9.7	-0.3		
Jul-Dec '83	-10.7	-4.7	0.0		-9.5	-0.1	0.2	
Jan '84	-12.3	-6.4	-1.7	-11.3	-9.0	0.5	0.8	8.2



# OTHER INDUSTRIAL COUNTRIES: NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate      — Real effective exchange rate based on consumer price indices





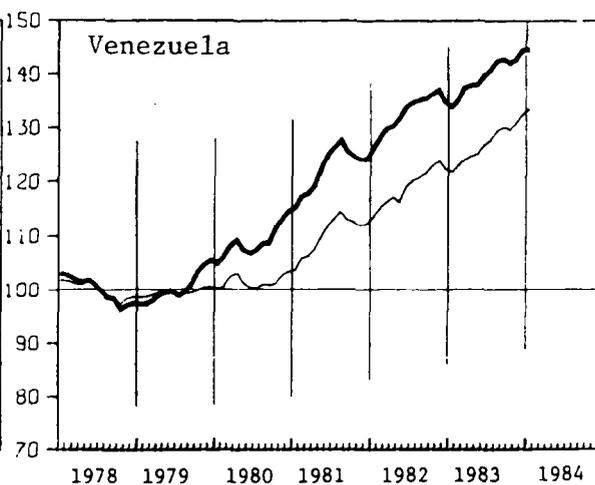
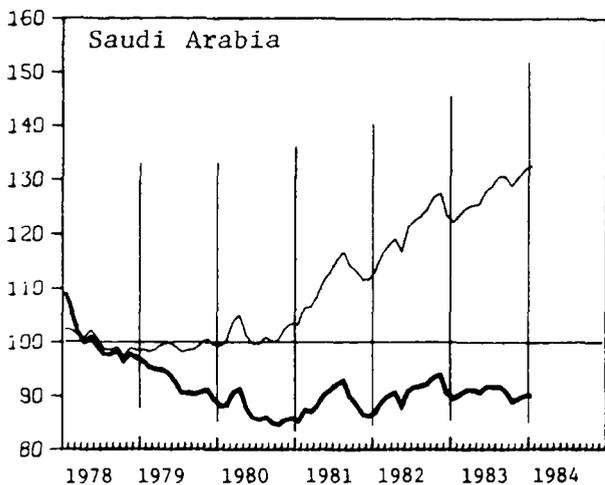
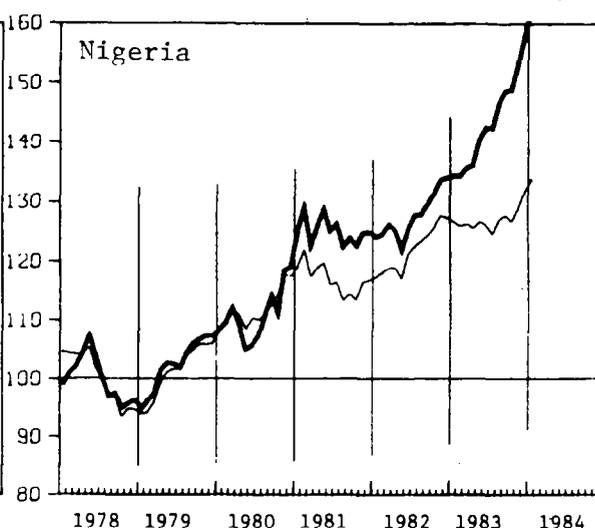
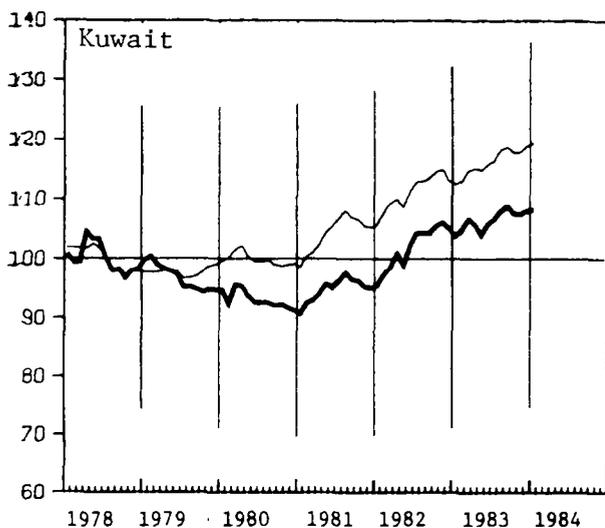
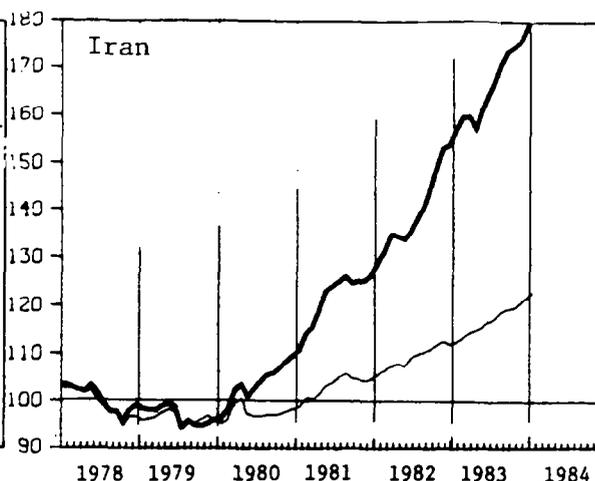
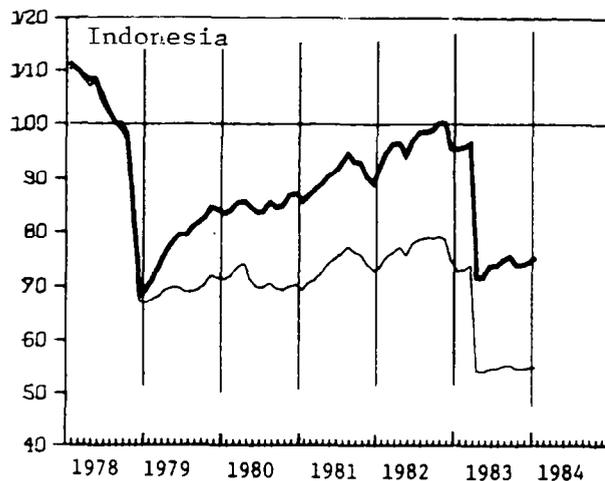
# DEVELOPING COUNTRIES--OIL EXPORTING

## NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate

— Real effective exchange rate based on consumer price indices





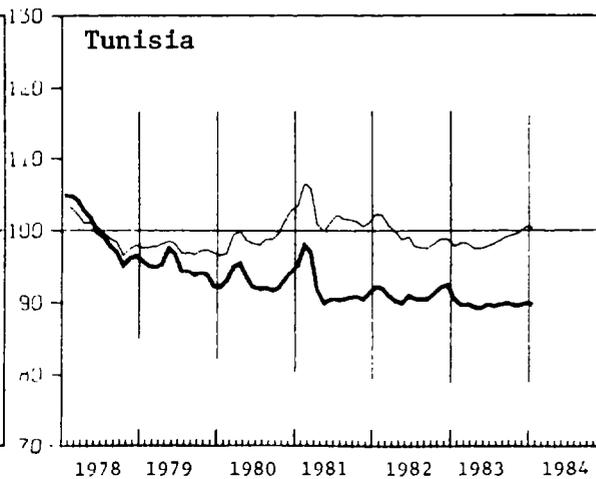
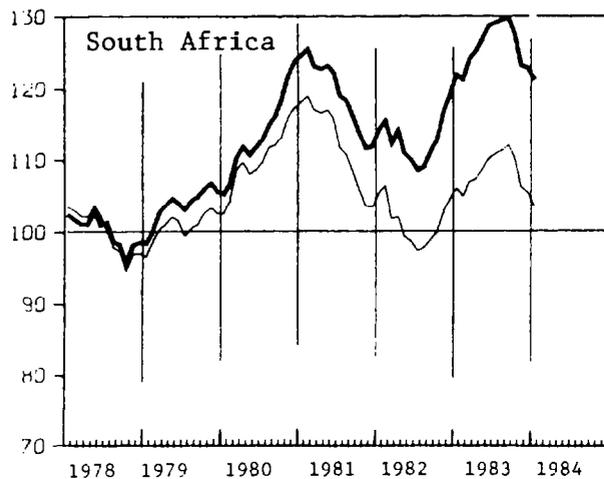
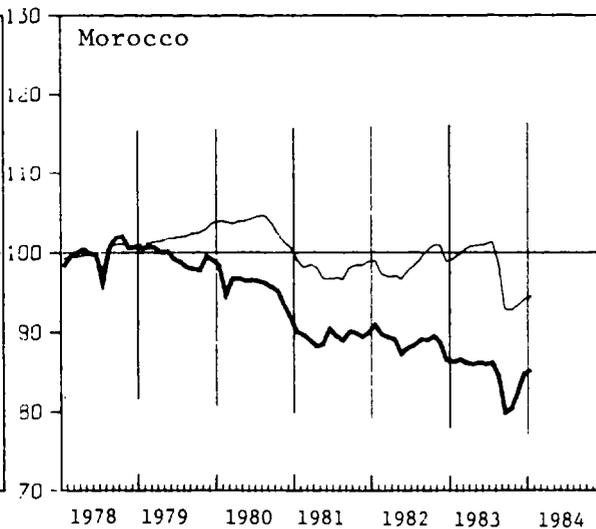
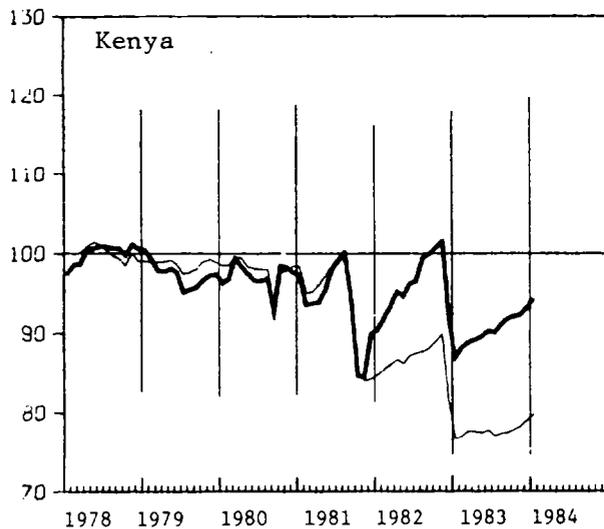
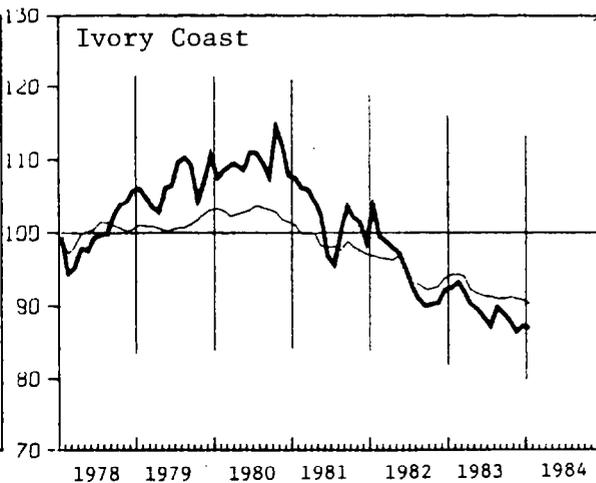
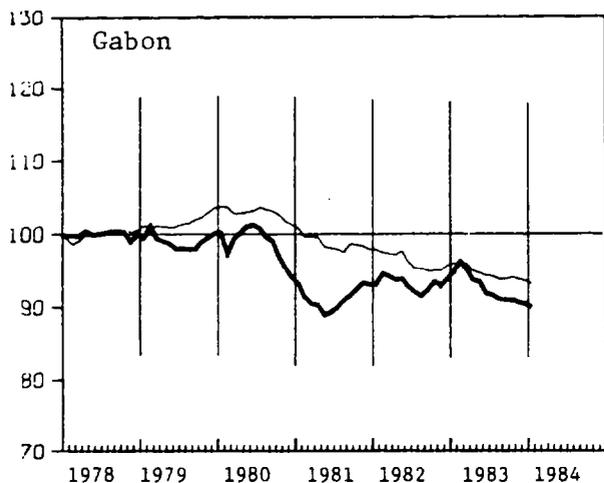
# DEVELOPING COUNTRIES --AFRICA

## NOMINAL AND REAL EFFECTIVE EXCHANGE RATES,

### 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate      — Real effective exchange rate based on consumer price indices



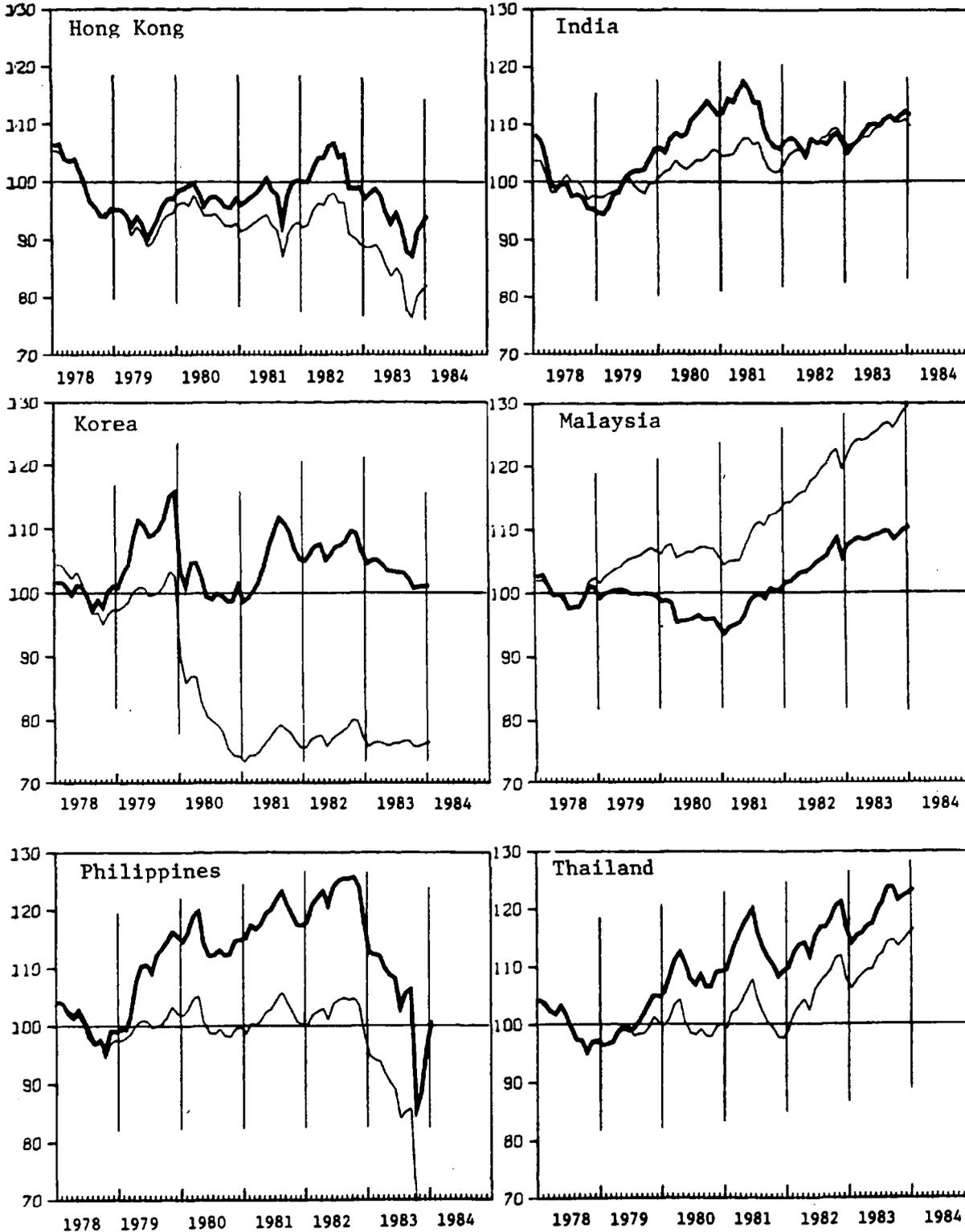


# DEVELOPING COUNTRIES--ASIA

## NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate      — Real effective exchange rate based on consumer price indices





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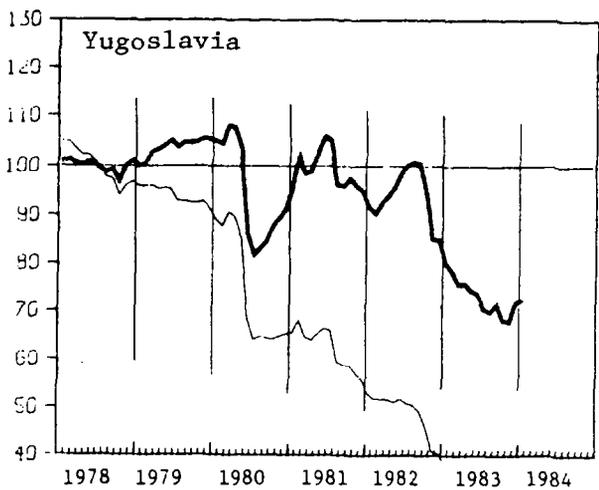
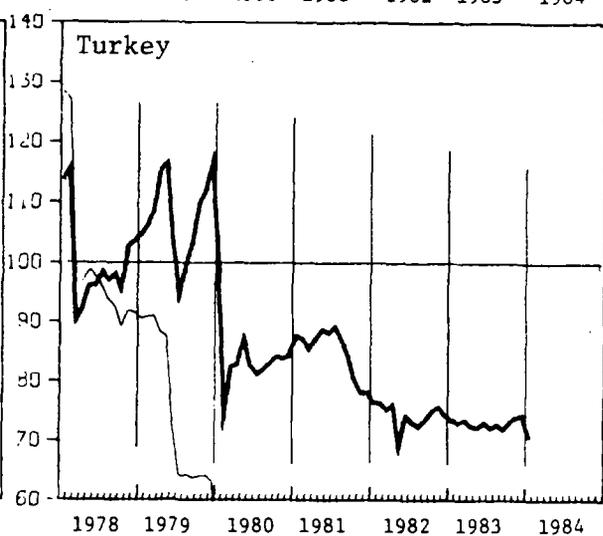
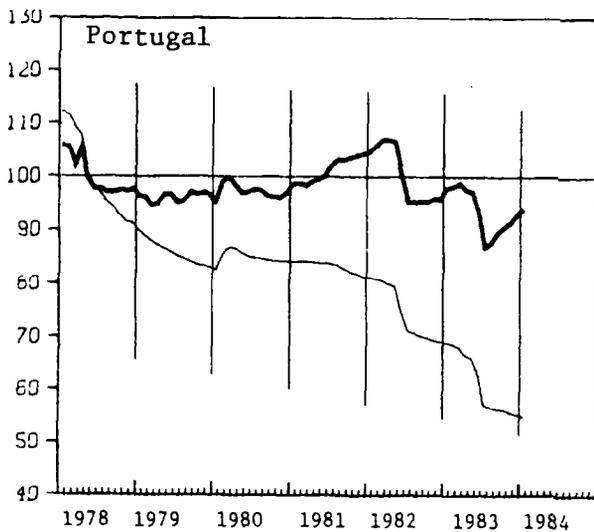
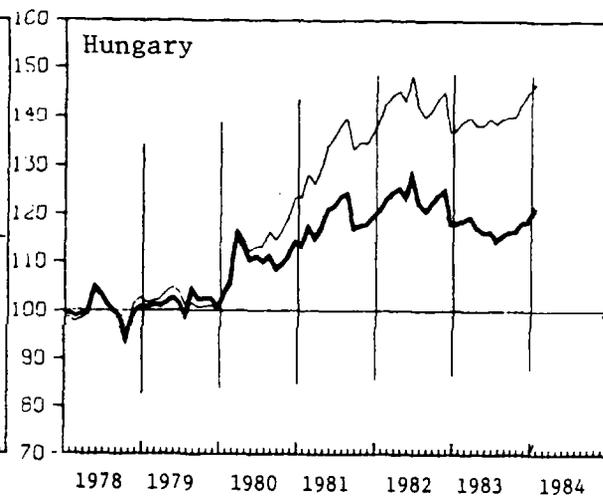
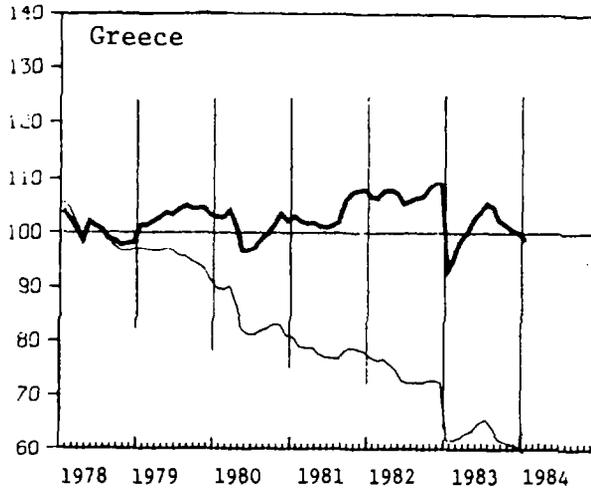
# DEVELOPING COUNTRIES--EUROPE

## NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate

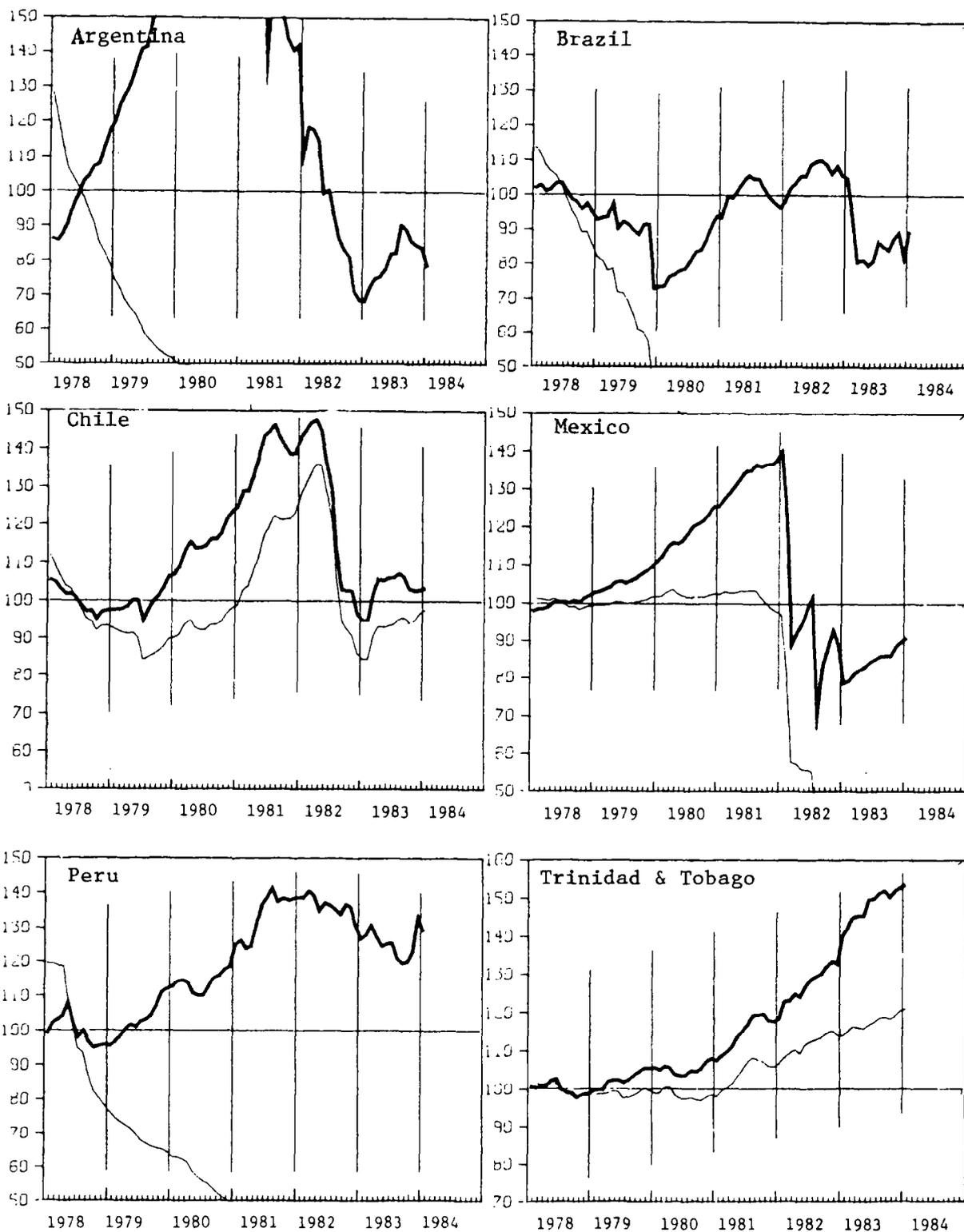
— Real effective exchange rate based on  
consumer price indices





# DEVELOPING COUNTRIES--WESTERN HEMISPHERE NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, 1978 - JANUARY 1984 (Index 1978 = 100)

— Nominal effective exchange rate      — Real effective exchange rate based on consumer price indices



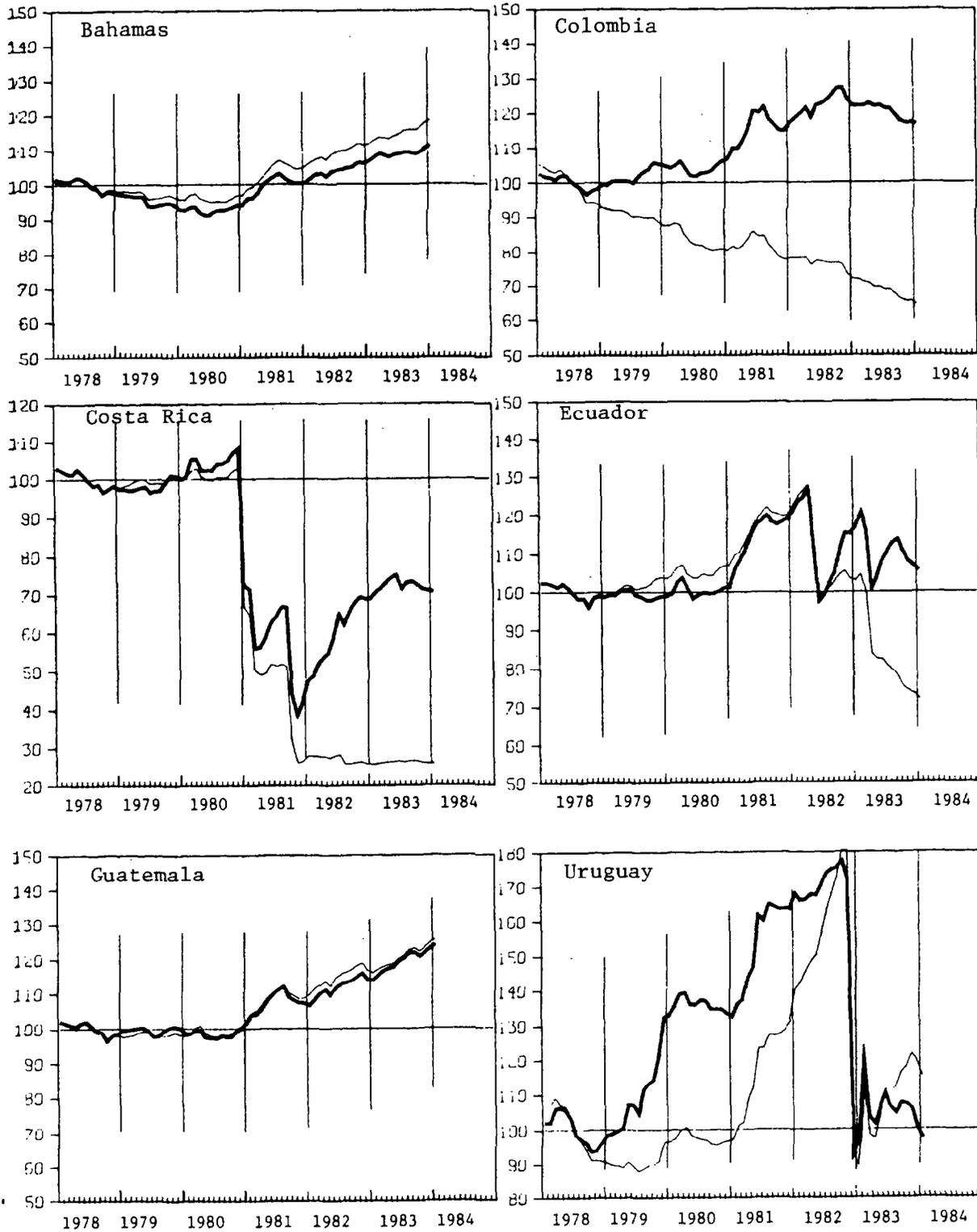


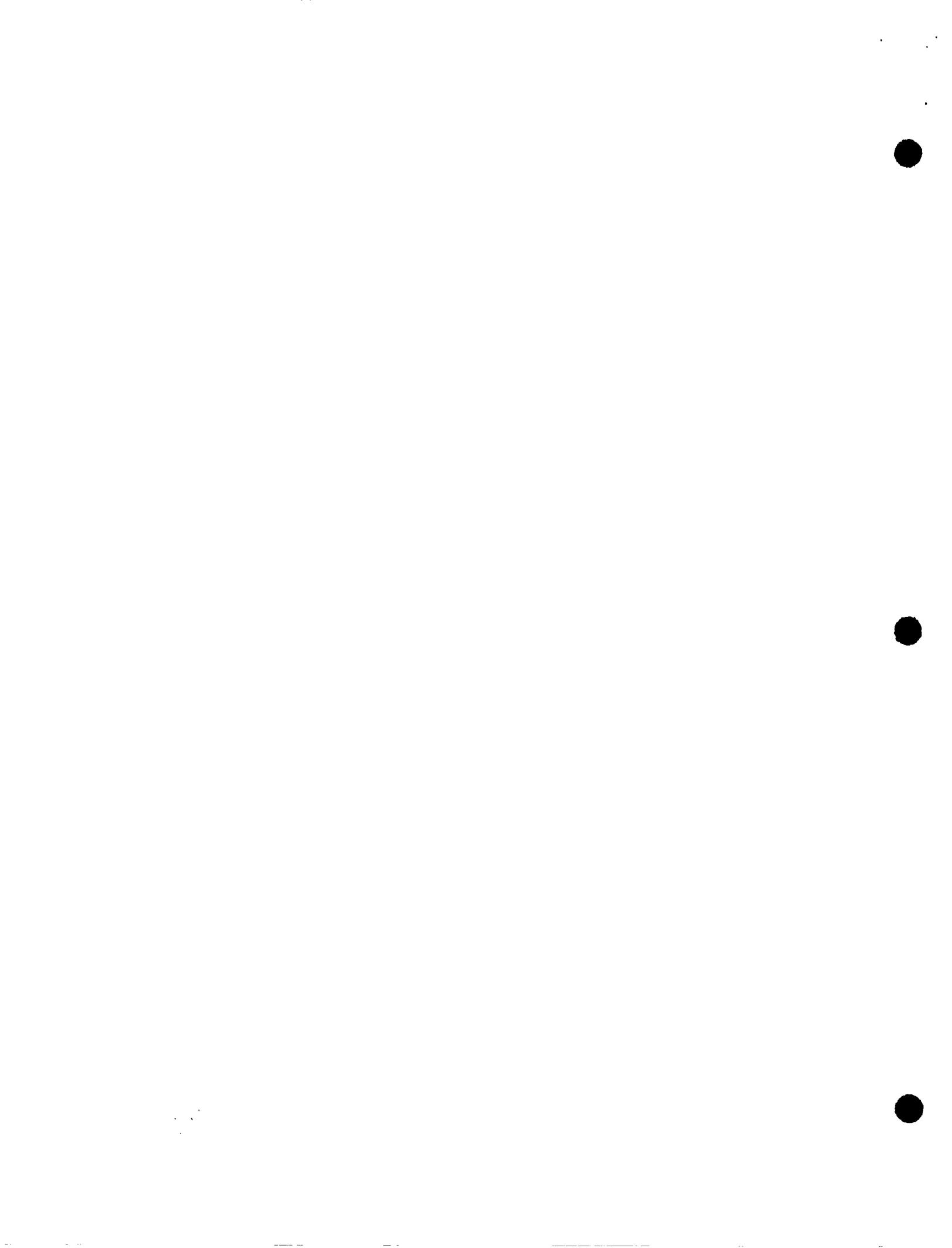
# DEVELOPING COUNTRIES--WESTERN HEMISPHERE NOMINAL AND REAL EFFECTIVE EXCHANGE RATES,

1978 - JANUARY 1984

(Index 1978 = 100)

— Nominal effective exchange rate      — Real effective exchange rate based on consumer price indices





Nominal and Real Effective Exchange Rates 1/

African Department

Countries	Type of index <u>2/</u>	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
Algeria	III.N	100.0	98.8	101.0	111.0	122.0	138.4	144.0
Benin	III.N	100.0	100.5	100.9	96.9	91.8	86.9	86.1
Botswana	III.R	100.0	98.0	96.5	101.2	96.8	93.5	94.4
	III.N	100.0	98.9	98.1	101.0	97.9	95.1	96.7
Burundi	III.N	100.0	96.1	95.9	111.0	124.2	130.9	108.8
Cameroon (b)	III.R	100.0	98.7	97.6	90.8	87.7	92.0	93.2
	III.N	100.0	101.2	102.1	95.5	89.2	82.9	81.5
Cape Verde	III.N	100.0	96.0	90.4	93.8	96.9	101.6	107.1
Central African Rep.	III.N	100.0	102.5	107.2	107.6	109.3	112.8	115.0
Chad	III.N	100.0	103.2	104.9	99.5	96.9	97.1	96.0
Comoros	III.N	100.0	100.0	99.5	95.9	93.2	90.2	89.5
Congo (a,b)	III.R	100.0	99.6	95.7	95.9	95.7	94.2	94.8
	III.N	100.0	104.5	110.0	109.9	112.7	121.2	123.5
Djibouti	III.N	100.0	96.8	97.1	114.8	132.2	150.7	157.1

1/ All data refer to period averages. Countries with changes in real effective exchange rates that exceed 20 percent between the average level for 1978 and that for January 1984 are flagged by one check mark. Countries with changes that exceed 30 percent are flagged by two check marks.

Letters in parentheses next to country names refer to qualifications of the data used as follows: (a) price index significantly affected by price controls; (b) price index has limited coverage in terms of commodities or geographical area; (c) price index based on out-of-date consumer basket; and (d) price index believed to underestimate the actual rate of inflation.

2/ N refers to the nominal effective exchange rate and R to the real effective exchange rate. The notations, I, II, and III indicate whether the first, second, and third index is used.

Nominal and Real Effective Exchange Rates

African Department (continued)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
Equatorial Guinea	III.N	100.0	101.9	75.1	49.7	48.7	46.0	46.2
✓ Ethiopia (b)	III.R	100.0	102.5	95.7	105.8	114.5	121.5	123.8
	III.N	100.0	97.6	100.3	117.7	133.3	153.3	160.7
Gabon (b)	III.R	100.0	99.0	98.7	91.2	93.2	90.9	89.9
	III.N	100.0	101.6	102.8	98.7	96.2	93.8	93.0
Gambia, The	III.R	100.0	102.9	105.0	100.1	100.2	99.5	96.6
	III.N	100.0	106.5	116.2	116.0	114.1	110.0	108.2
Ghana (d)	III.R	100.0	78.5	102.6	230.0	287.2	79.6	84.0
	III.N	100.0	52.1	51.4	58.6	64.8	7.5	6.9
Guinea	III.N	100.0	97.7	98.3	104.9	110.5	122.8	126.0
Guinea-Bissau	III.N	100.0	103.1	105.0	116.8	132.0	162.6	109.1
Ivory Coast	III.R	100.0	106.8	109.7	102.0	94.8	87.9	86.9
	III.N	100.0	101.2	102.7	98.6	94.5	91.0	90.2
Kenya	III.R	100.0	97.4	97.1	93.7	96.0	91.7	93.0
	III.N	100.0	98.6	98.0	94.0	86.6	77.8	79.3
Lesotho (b,d)	III.R	100.0	102.5	104.9	103.7	104.0	106.0	105.0
	III.N	100.0	99.9	100.2	100.4	99.9	100.2	100.0
✓✓ Liberia	III.R	100.0	98.1	100.7	114.6	123.5	131.9	135.6
	III.N	100.0	95.7	95.9	111.5	122.5	136.2	141.6

Nominal and Real Effective Exchange Rates

African Department (continued)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
✓ Madagascar (a,b)	III.R	100.0	105.5	111.9	122.8	131.5	128.0	124.7
	III.N	100.0	101.0	101.9	94.9	84.8	73.8	71.9
Malawi (b,c)	III.R	100.0	98.6	99.6	100.9	98.3	102.6	101.8
	III.N	100.0	98.4	94.9	98.0	95.9	90.2	86.3
Mali	III.N	100.0	100.0	99.6	95.9	93.0	89.7	88.9
Mauritania	III.N	100.0	95.0	95.3	112.2	121.7	134.9	138.6
Mauritius	III.R	100.0	108.9	96.8	100.4	96.4	95.8	94.1
	III.N	100.0	92.3	74.3	74.4	70.7	71.8	70.9
Morocco	III.R	100.0	99.3	95.7	89.4	88.8	82.5	83.0
	III.N	100.0	102.1	103.4	97.8	98.6	95.5	94.6
Niger	III.R	100.0	98.6	97.5	102.3	100.7	86.0	85.4
	III.N	100.0	101.0	102.3	97.9	95.1	91.0	89.7
✓✓ Nigeria	III.R	100.0	102.4	111.0	125.1	127.7	149.7	162.7
	III.N	100.0	101.2	112.0	117.0	121.9	127.7	133.9
✓✓ Rwanda	III.R	100.0	103.0	99.4	111.5	130.0	141.8	144.7
	III.N	100.0	96.5	96.8	111.5	125.1	133.9	134.1
Sao Tome & Principe	III.N	100.0	101.4	101.8	112.3	122.7	147.1	153.3
Senegal	III.R	100.0	99.8	95.1	85.1	87.5	89.5	89.7
	III.N	100.0	101.8	102.6	98.3	96.5	95.0	94.7
✓ Seychelles (b)	III.R	100.0	106.0	100.7	117.1	116.9	127.6	128.3
	III.N	100.0	104.1	99.7	116.7	127.8	136.7	140.8

Nominal and Real Effective Exchange Rates

African Department (concluded)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
✓✓ Sierra Leone	III.R	100.0	102.7	98.4	114.6	146.1	145.4	172.4
	III.N	100.0	93.4	91.2	95.3	100.1	56.2	58.8
✓✓ Somalia	III.R	100.0	106.8	146.0	177.7	141.8	169.5	170.7
	III.N	100.0	96.8	97.6	93.7	68.0	60.7	59.4
Swaziland	III.R	100.0	103.4	110.3	115.5	109.1	115.4	118.5
	III.N	100.0	99.7	101.9	100.9	96.3	97.4	95.0
✓✓ Tanzania (a,b,d)	III.R	100.0	92.9	106.8	139.6	165.6	171.0	181.3
	III.N	100.0	89.8	90.6	105.4	106.6	93.1	96.1
Togo (b,c)	III.R	100.0	99.0	100.6	104.1	99.8	97.5	97.5
	III.N	100.0	100.1	101.0	96.6	91.5	87.4	86.6
Tunisia	III.R	100.0	94.9	93.2	92.3	91.2	89.9	89.8
	III.N	100.0	97.5	99.2	102.2	99.3	99.4	100.4
✓✓ Uganda (b,c) <u>3/</u>	III.R	100.0	173.4	303.3	207.4	72.9	51.0	48.1
	III.N	100.0	98.5	98.7	48.5	9.6	5.4	4.7
Upper Volta	III.N	100.0	101.1	101.6	95.5	91.2	85.7	84.3
✓✓ Zaire (b)	III.R	100.0	87.0	71.1	65.8	68.6	63.3	34.8
	III.N	100.0	48.3	31.1	25.0	20.9	11.6	5.1
Zambia	III.R	100.0	98.8	97.0	103.1	113.5	101.1	99.3
	III.N	100.0	98.9	98.8	102.6	109.4	84.3	78.7
Zimbabwe (d)	III.R	100.0	97.3	92.3	98.7	109.8	99.3	103.7
	III.N	100.0	95.4	97.7	104.0	110.1	86.9	85.5

3/ New composite exchange rate (weighted average of multiple rates).

Nominal and Real Effective Exchange Rates

Asian Department

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
Bangladesh	III.R	100.0	100.1	102.4	99.3	92.6	92.6	96.0
	III.N	100.0	94.9	96.0	88.3	78.2	74.9	75.7
Burma (a,b)	III.R	100.0	101.3	94.1	83.1	84.6	87.8	84.8
	III.N	100.0	102.8	105.7	102.8	107.0	110.5	110.6
China, People's Rep.	III.N	100.0	109.7	115.4	108.6	108.6	114.0	112.6
Fiji	III.R	100.0	99.1	102.3	103.2	102.8	101.2	100.9
	III.N	100.0	100.7	102.3	102.8	104.4	102.0	102.1
India	II.R	100.0	99.9	109.9	112.2	107.0	111.1	111.5
	II.N	100.0	98.9	103.3	105.0	106.9	110.7	109.6
✓ Indonesia	III.R	100.0	78.5	85.0	90.4	97.0	74.3	75.3
	III.N	100.0	69.4	70.9	73.7	76.9	54.7	54.9
Japan	I.R	100.0	86.7	77.4	87.5	80.6	86.9	90.2
	I.N	100.0	91.6	87.6	102.7	99.0	113.3	119.6
Korea	II.R	100.0	109.1	101.0	105.4	107.1	101.8	101.1
	II.N	100.0	100.2	81.0	76.3	77.6	76.2	76.5
Laos P. D. Rep.	III.N	100.0	24.4	466.8	502.0	155.5	161.9	163.4
Malaysia	II.R	100.0	100.0	96.5	98.7	104.6	109.3	110.4
	II.N	100.0	104.9	106.7	109.7	118.0	126.8	129.7
Maldives	III.N	100.0	116.7	114.1	125.0	148.4	159.7	163.5
Nepal	III.R	100.0	94.7	94.4	99.8	109.2	112.8	116.3
	III.N	100.0	100.0	100.2	105.6	108.3	103.8	104.7

Nominal and Real Effective Exchange Rates

Asian Department (concluded)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
Papua New Guinea	III.R	100.0	98.1	106.6	111.1	110.6	104.9	105.5
	III.N	100.0	99.1	105.6	110.2	111.2	101.9	101.6
Philippines (b)	II.R	100.0	109.2	114.6	118.8	122.7	97.5	100.8
	II.N	100.0	100.2	100.6	101.9	102.7	76.2	67.9
Singapore	II.R	100.0	98.8	97.9	105.5	110.0	112.2	114.9
	II.N	100.0	103.7	106.9	118.1	128.2	139.7	143.4
✓ Solomon Islands	III.R	100.0	100.5	106.4	113.1	117.8	110.1	122.3
	III.N	100.0	100.2	103.9	103.0	101.5	87.6	87.3
✓✓ Sri Lanka	III.R	100.0	106.6	122.0	128.8	137.5	139.8	142.0
	III.N	100.0	98.8	93.9	89.8	94.0	90.8	91.6
✓ Thailand	II.R	100.0	100.2	108.7	113.5	115.8	122.6	123.5
	II.N	100.0	98.8	100.0	102.0	106.1	114.2	116.6
Vanuatu	III.R	100.0	100.9	101.0	99.4	103.1	102.0	99.5
	III.N	100.0	104.6	104.4	88.5	94.4	100.7	100.3
Viet Nam	III.N	100.0	93.5	94.6	53.8	26.1	28.6	29.4
Western Samoa	III.R	100.0	90.2	96.3	99.8	102.7	97.6	98.9
	III.N	100.0	89.3	80.3	76.5	73.1	59.9	59.9

Nominal and Real Effective Exchange Rates

European Department

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
Australia	II.R	100.0	96.6	97.3	105.2	105.5	104.9	108.6
	II.N	100.0	97.1	100.5	110.1	107.6	102.9	106.5
Austria	I.R	100.0	97.3	93.7	86.9	89.3	89.3	87.7
	I.N	100.0	103.1	105.8	101.5	105.8	107.1	105.7
✓✓ Belgium	I.R	100.0	97.0	93.8	86.9	76.0	69.2	67.9
	I.N	100.0	100.9	100.1	95.8	87.4	83.6	82.5
Cyprus	III.R	100.0	98.9	97.7	95.2	92.9	90.8	90.5
	III.N	100.0	102.1	104.6	106.1	109.9	116.2	118.5
✓ Denmark	I.R	100.0	99.8	90.6	81.8	79.3	77.3	76.1
	I.N	100.0	99.5	91.6	84.6	81.2	79.0	77.6
Finland	II.R	100.0	99.3	102.3	105.7	108.8	108.1	108.3
	II.N	100.0	100.9	105.4	108.7	112.2	111.1	112.5
France	I.R	100.0	103.6	105.8	98.6	95.0	88.0	86.1
	I.N	100.0	101.1	101.1	91.5	83.4	74.0	72.1
Germany	I.R	100.0	100.8	97.0	86.7	87.1	85.4	83.2
	I.N	100.0	105.4	105.6	99.1	104.7	107.1	105.5
Greece (a)	II.R	100.0	103.4	100.6	103.6	107.3	102.4	98.6
	II.N	100.0	95.4	84.3	78.2	74.0	62.4	59.4
Hong Kong	II.R	100.0	94.1	97.4	97.9	102.4	90.9	94.1
	II.N	100.0	92.6	94.6	92.0	94.2	80.7	82.2

Nominal and Real Effective Exchange Rates

European Department (continued)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
✓ Hungary (a)	II.R	100.0	101.7	110.4	118.9	123.2	116.8	121.7
	II.N	100.0	102.0	114.3	132.9	142.7	141.1	147.2
Iceland	II.R	100.0	96.3	99.6	106.8	96.9	95.2	99.1
	II.N	100.0	73.3	54.4	41.7	28.2	13.8	13.8
Ireland	II.R	100.0	102.1	102.1	101.1	108.8	109.1	108.3
	II.N	100.0	100.0	96.9	88.8	88.9	85.0	83.8
Israel (a)	II.R	100.0	107.7	109.8	111.0	117.2	126.9	118.5
	II.N	100.0	68.6	34.5	17.6	9.3	3.6	2.2
Italy	I.R	100.0	104.6	107.9	105.4	107.3	112.2	112.0
	I.N	100.0	96.8	93.1	81.3	75.1	69.3	67.4
Luxembourg	III.R	100.0	98.4	96.1	93.7	88.2	88.4	88.7
	III.N	100.0	100.0	99.6	97.5	90.5	87.8	87.1
Malta	III.R	100.0	98.6	102.9	111.4	114.8	112.2	110.7
	III.N	100.0	101.6	104.6	113.7	122.0	132.7	136.4
Netherlands	I.R	100.0	98.7	91.9	81.2	84.4	83.4	82.1
	I.N	100.0	101.9	101.9	96.3	100.8	100.7	99.3
✓✓ Netherlands Antilles	III.R	100.0	97.5	99.1	119.1	131.1	142.9	148.4
	III.N	100.0	96.6	97.4	116.7	133.8	156.3	165.2
New Zealand	II.R	100.0	101.1	99.9	100.1	102.8	98.5	98.7
	II.N	100.0	97.5	92.7	89.1	85.5	82.1	83.0

Nominal and Real Effective Exchange Rates

European Department (concluded)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
Norway	I.R	100.0	96.2	98.1	103.0	107.0	103.5	101.0
	I.N	100.0	99.1	100.9	100.0	100.6	96.4	94.6
Portugal	II.R	100.0	96.1	97.3	101.2	100.4	90.0	94.3
	II.N	100.0	85.8	84.9	83.3	74.7	56.1	54.8
Romania	III.N	100.0	98.4	100.4	143.9	162.5	162.0	141.3
✓ South Africa	II.R	100.0	103.7	113.8	119.4	112.9	127.0	121.1
	II.N	100.0	100.7	110.1	112.2	101.3	109.3	103.4
Spain	II.R	100.0	115.2	110.5	104.1	103.9	90.3	92.2
	II.N	100.0	111.0	105.5	98.6	96.1	82.6	83.7
✓ Sweden	I.R	100.0	98.7	99.0	97.8	87.2	77.4	78.4
	I.N	100.0	100.7	101.2	97.8	87.5	76.0	75.9
Switzerland	I.R	100.0	96.9	90.5	87.3	90.3	90.5	91.0
	I.N	100.0	101.6	99.9	100.5	108.2	111.5	113.1
✓ Turkey (a)	III.R	100.0	107.6	84.0	85.2	74.3	73.1	70.5
	III.N	100.0	75.3	31.2	25.3	19.2	14.7	12.7
✓✓ United Kingdom	I.R	100.0	116.8	143.4	151.7	145.3	136.4	134.9
	I.N	100.0	106.5	117.1	117.2	111.7	103.7	101.4
✓ Yugoslavia (a)	II.R	100.0	103.7	94.3	99.0	94.0	69.8	72.4
	II.N	100.0	94.0	74.8	62.3	49.0	25.9	23.3

Nominal and Real Effective Exchange Rates

Middle Eastern Department

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
✓ Bahrain <u>4/</u>	III.R	100.0	92.2	86.9	102.1	116.9	126.6	129.2
	III.N	100.0	99.1	102.7	121.4	141.5	167.8	176.1
✓ Egypt (a,b,c) <u>3/</u>	III.R	100.0	81.6	86.9	94.2	103.8	119.6	124.5
	III.N	100.0	82.6	83.9	92.9	98.8	105.4	109.5
✓✓ Iran, I.R. of (b)	III.R	100.0	96.9	103.8	121.8	140.1	173.6	181.7
	III.N	100.0	96.4	97.6	103.2	109.5	119.9	123.3
Iraq	III.N	100.0	97.8	100.5	117.5	133.8	150.0	156.8
Jordan (b)	III.R	100.0	105.1	105.4	103.9	106.7	109.5	108.5
	III.N	100.0	100.3	102.6	103.7	106.4	110.5	110.7
Kuwait (b)	III.R	100.0	96.8	93.0	94.8	101.9	107.8	108.2
	III.N	100.0	97.8	99.9	104.2	111.2	117.9	119.3
Lebanon	III.N	100.0	87.8	83.6	79.6	82.9	91.0	86.7
Libya	III.N	100.0	96.0	97.1	118.3	135.4	156.7	164.5
Oman	III.N	100.0	97.2	96.7	106.6	119.0	129.2	132.7
Pakistan (a,c)	II.R	100.0	97.1	97.2	109.6	99.8	99.5	101.7
	II.N	100.0	98.7	100.3	113.2	106.2	106.5	107.9
Oatar	III.N	100.0	100.6	104.5	118.1	133.5	150.3	155.7
Saudi Arabia	III.R	100.0	92.4	87.0	88.7	90.8	90.5	90.0
	III.N	100.0	99.1	101.4	111.0	121.2	130.3	132.7

3/ New composite exchange rate (weighted average of multiple rates).

4/ Bahrain's real effective exchange rate index is believed to overstate the real appreciation that may have occurred because of a problem in the way rents are treated in its price index. This price index is in the process of revision.

Nominal and Real Effective Exchange Rates

Middle Eastern Department (concluded)

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Countries	Type of index	1978	1979	1980	1981	1982	<u>1983</u>	<u>1984</u>
							July- Dec.	Jan.
Sudan	III.N	100.0	86.7	76.9	86.2	57.4	51.4	54.6
Syrian Arab Rep.	III.N	100.0	95.8	97.3	118.3	135.1	158.5	166.9
United Arab Emirates	III.N	100.0	98.9	101.7	113.7	126.4	137.8	141.6
Yemen Arab Rep.	III.N	100.0	97.6	99.3	113.2	127.4	141.3	144.0
Yemen, P.D. Rep.	III.N	100.0	97.6	97.9	111.9	126.5	140.3	144.8

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Nominal and Real Effective Exchange Rates

Western Hemisphere Department

Countries	Type of index	1978	1979	1980	1981	1982	<u>1983</u>	<u>1984</u>
							July- Dec.	Jan.
✓ Antigua and Barbuda	III.R	100.0	102.2	104.8	112.1	115.7	119.5	128.3
	III.N	100.0	97.3	95.0	100.7	107.0	112.6	114.9
✓ Argentina	II.R	100.0	141.0	185.0	170.6	95.4	85.5	78.2
	II.N	100.0	61.2	46.7	27.0	7.0	1.1	0.6
Bahamas	III.R	100.0	95.5	92.6	99.5	103.7	109.3	111.4
	III.N	100.0	97.2	96.0	102.9	108.8	116.0	118.7
✓✓ Barbados	III.R	100.0	103.6	103.0	112.0	121.1	129.4	131.8
	III.N	100.0	98.9	98.6	105.0	112.0	120.7	123.4
Belize	III.R	100.0	97.2	95.0	100.7	106.4	112.9	115.2
	III.N	100.0	97.2	95.0	100.7	106.4	112.9	115.2
✓✓ Bolivia	III.R	100.0	102.0	109.9	144.9	157.1	172.6	150.3
	III.N	100.0	102.9	91.6	110.2	73.3	20.0	10.3
Brazil	II.R	100.0	90.4	81.6	100.6	106.2	85.8	89.9
	II.N	100.0	68.2	35.6	23.8	14.5	4.2	3.2
Canada	I.R	100.0	96.9	95.8	98.7	102.6	108.0	108.4
	I.N	100.0	96.2	96.0	97.3	97.6	100.1	100.1
Chile (a)	III.R	100.0	99.7	115.2	137.4	125.8	104.7	103.6
	III.N	100.0	89.1	93.7	114.3	115.2	95.2	97.9
Colombia (a)	III.R	100.0	101.6	103.9	115.1	122.4	118.9	116.5
	III.N	100.0	90.7	83.6	81.6	76.7	66.8	64.3
✓ Costa Rica	III.R	100.0	98.0	103.9	58.2	59.5	72.0	70.5
	III.N	100.0	99.2	100.9	47.4	27.0	26.2	25.9

Nominal and Real Effective Exchange Rates

Western Hemisphere Department (continued)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
✓✓ Dominica	III.R	100.0	102.5	112.0	124.6	131.1	140.6	143.9
	III.N	100.0	95.5	91.7	99.4	107.5	116.4	119.8
✓ Dominican Republic	III.R	100.0	95.4	98.2	106.2	114.8	124.5	127.4
	III.N	100.0	98.2	100.2	114.4	127.1	144.6	151.0
Ecuador (a)	III.R	100.0	99.1	100.3	114.1	112.9	110.3	105.3
	III.N	100.0	101.2	104.9	116.4	110.9	76.5	71.6
✓✓ El Salvador	III.R	100.0	104.0	109.5	122.9	134.7	157.6	164.7
	III.N	100.0	98.2	98.6	105.6	110.7	115.8	117.9
✓✓ Grenada	III.R	100.0	94.7	99.9	120.3	132.2	147.1	152.1
	III.N	100.0	95.2	92.1	102.5	112.3	122.5	126.7
✓ Guatemala	III.R	100.0	99.6	98.4	107.6	111.9	121.5	124.2
	III.N	100.0	98.3	99.0	107.6	114.7	122.8	125.6
✓✓ Guyana (d)	III.R	100.0	102.5	100.3	108.3	123.1	173.0	168.8
	III.N	100.0	97.3	96.1	95.8	97.9	108.8	97.2
✓ Haiti (d)	III.R	100.0	101.3	105.7	106.3	112.6	122.0	123.5
	III.N	100.0	99.5	100.5	106.3	111.3	117.2	119.0
✓✓ Honduras	III.R	100.0	101.4	105.0	110.3	118.6	131.6	132.7
	III.N	100.0	99.2	100.4	106.9	113.1	120.1	122.4
✓ Jamaica <u>3/</u>	III.R	100.0	90.6	98.9	107.2	112.3	105.7	74.2
	III.N	100.0	75.8	74.0	79.1	84.0	72.6	49.3
Mexico	III.R	100.0	105.8	118.2	133.4	96.9	87.1	91.1
	III.N	100.0	100.3	102.2	101.9	54.0	22.1	20.4

3/ New composite exchange rate (weighted average of multiple rates).

Nominal and Real Effective Exchange Rates

Western Hemisphere Department (concluded)

Countries	Type of index	1978	1979	1980	1981	1982	1983	1984
							July- Dec.	Jan.
Nicaragua	III.N	100.0	77.4	71.1	77.0	82.3	89.8	92.2
Panama	III.R	100.0	97.3	98.8	100.2	102.0	103.2	103.5
	III.N	100.0	100.1	101.7	107.1	113.0	119.8	121.7
✓✓ Paraguay	III.R	100.0	106.9	113.2	128.7	140.5	164.1	173.4
	III.N	100.0	123.5	159.2	241.9	386.0	846.8	1085.0
✓ Peru (a)	III.R	100.0	102.9	113.9	133.3	136.5	123.7	128.9
	III.N	100.0	69.3	56.6	43.6	31.0	12.8	11.4
St. Lucia	III.R	100.0	95.6	97.6	108.8	113.0	116.1	116.1
	III.N	100.0	96.7	94.0	100.5	107.0	113.4	116.0
✓✓ St. Vincent	III.R	100.0	99.5	97.9	111.9	119.4	130.7	133.3
	III.N	100.0	95.8	92.0	99.6	107.2	115.7	119.1
✓✓ Suriname	III.R	100.0	102.4	104.2	116.0	124.4	134.9	138.5
	III.N	100.0	97.7	99.3	113.3	123.9	139.9	145.7
✓✓ Trinidad and Tobago	III.R	100.0	102.4	105.2	114.7	127.3	151.5	153.7
	III.N	100.0	98.8	98.3	104.1	111.6	118.9	121.1
✓✓ United States	I.R	100.0	97.5	98.6	113.1	126.8	138.1	143.1
	I.N	100.0	96.5	96.0	110.4	123.4	134.8	139.6
Uruguay	III.R	100.0	109.1	135.9	153.1	164.5	105.3	97.2
	III.N	100.0	90.1	97.3	117.5	153.4	116.4	114.9
✓✓ Venezuela	III.R	100.0	100.4	108.9	122.5	132.9	142.6	144.5
	III.N	100.0	99.6	101.5	110.2	119.1	130.1	133.5

Statistical Appendix

First Index

Countries for which the index is calculated:

United States	Austria	Germany	Sweden
Canada	Belgium	Italy	Switzerland
Japan	Denmark	Netherlands	United Kingdom
	France	Norway	

The index of the real effective exchange rate for the above countries uses data on normalized unit labor costs in manufacturing. These data are intended to abstract from cyclical swings in conventionally-measured productivity which often distort the actual unit labor cost series (mainly because cyclical changes in reported employment do not correspond closely to those in effective inputs of labor). The normalized series are calculated by dividing an index of actual hourly compensation per worker by an index of output per manhour adjusted so as to eliminate the estimated effects of cyclical swings. Quarterly data on hourly compensation per worker and on output per manhour are obtained from national sources. However, these data are often available with a considerable lag, and this obliges the staff to update the series on the basis of its own estimates. The monthly series for these variables are obtained by simple interpolation of the quarterly series. All the data are seasonally adjusted. Finally, the adjustment for cyclical swings is estimated by the staff.

The index of the real effective exchange rate for each of the 14 countries represents the ratio of the country's index of normalized unit labor costs to a weighted geometric average of corresponding indices for the other thirteen countries, after expression of all of the national indices of normalized unit labor costs in terms of a common currency. In mathematical terms, the formula is

$$R_i = C_i \cdot E_i / \prod_{j \neq i} (C_j \cdot E_j)^{W_{ij}} \quad (1)$$

where  $R_i$  = real effective exchange rate for country i,

$C_i$  = normalized unit labor cost in manufacturing in terms of local currency for country i,

$E_i$  = exchange rate of country i in terms of U.S. cents,

$W_{ij}$  = weight of country j in the real effective exchange rate of country i.

The weights are designed to make the indicators particularly relevant with respect to movements in costs and prices affecting exports of manufactures. They are built up from disaggregated (i.e., four-digit SITC) trade data for manufactures in 1975. At this disaggregated level, they take account of the relative importance of each of the other 13 countries (as measured by market shares) in the home market of the country considered, as well as in all of its foreign markets.

As a by-product of the calculations, a nominal effective exchange rate index is obtained by ignoring the movements in normalized unit labor costs. This nominal effective exchange rate can differ substantially from the normally used MERM effective exchange rate because both the weights and the number of countries included in the calculations are different.

Second Index

Countries for which the index is calculated: the preceding 14 countries plus

Australia	Argentina	Korea	India
Finland	Brazil	Portugal	Hungary
Iceland	Greece	Singapore	Pakistan
Ireland	Hong Kong	South Africa	Thailand
New Zealand	Israel	Yugoslavia	Philippines
Spain	Netherland		Malaysia
	Antilles		

The calculation of the real effective exchange rate uses monthly data on consumer prices, except for Brazil and India for which reference is made to footnote 1 of page 2 of this report. The data are normally obtained from International Financial Statistics (IFS). Where data are not available for recent months, but are available with not more than a six month lag, estimates for the most recent months are obtained by mechanical extrapolation of the rate of inflation or, where possible, on the basis of partial information. The price data are seasonally adjusted by the staff. In general, the exchange rate used is the monthly average of market rates (line a.h. in IFS).

For each of the 36 countries in this second group, the index of the real effective exchange rate is calculated by taking into account the relative importance of the other 35 countries in the imports of the country concerned, as well as in its export markets. On the export side, competition in home markets and in third markets is considered. The weighting scheme is based on the following formula:

$$W_{ij} = K_m \frac{X_{ji}}{X_{\cdot i}} + K_x \left( \frac{1}{2} \sum_{k \neq j} \frac{X_{ik}}{X_{i \cdot}} \frac{X_{jk}}{X_{\cdot k}} + \frac{1}{2} \frac{X_{ij}}{X_{i \cdot}} \right) \quad (2)$$

①
②

where  $W_{ij}$  = weight of country  $j$  in the real effective exchange rate of country  $i$ ,

$X_{ij}$  or  $X_{ik}$  = exports of country  $i$  to country  $j$  or market  $k$ ,

$K_m$  = the ratio of total imports from the group of 36 countries over the sum of these imports plus the total exports to all 37 foreign markets,

$K_x$  = the ratio of total exports to all 37 foreign markets over the sum of these exports plus the total imports from the group of 36 countries,

• = indicates summation over the relevant index.

The subscript  $i$  ranges over all 36 members of the group considered here, with  $X_{ij} = X_{ik} = 0$  for  $i = j = k$ . The subscript  $j$  ranges over all 36 members of the group. The subscript  $k$  ranges over 38 geographical markets (the 36 countries plus 2 other markets consisting of the "oil exporting countries" and the "rest of the world").

The formula includes 2 components, labeled ① and ②. The first component reflects the weight of country  $j$  in country  $i$ 's total imports from the group of 36 countries. The second component consists of two parts. The first part reflects the weight of country  $j$  in country  $i$ 's foreign markets (excluding  $j$  as a market); that is, it takes into account the competition between country  $i$  and country  $j$  in third markets. The second part of the second component reflects the weight of country  $j$  in country  $i$ 's total exports; that is, it takes into account the competition between country  $i$  and country  $j$  in country  $j$ 's home market. The two parts are arbitrarily assumed to have equal weights in the second component. The first component can be viewed as the "import component" and the second component as the "export component." The import and export components are then weighted by the relative importance of total imports from the group of 36 countries and total exports to all 37 foreign markets. It can readily be seen that  $\sum_j W_{ij} = 1$ .

The data on trade flows refer to 1980 and are obtained from Direction of Trade. For countries that are major entrepots (Hong Kong and Singapore), goods in transit are excluded from both the import and



exchange rates, the data necessary for such a calculation are being gathered, and revised series will be presented in future issues of this paper.

For this third group of countries, which produce mainly primary commodities, the index of the real effective exchange rate is based on a weighting scheme that takes into account only the bilateral trade flows with the group of 36 countries considered in the second set. Therefore, direct competition among primary producing countries is ignored.

In mathematical terms, the weights are defined as

$$W_{ij} = K_m \frac{X_{ji}}{X_{.i}} + K_x \frac{X_{ij}}{X_{i.}} \quad (3)$$

The subscript  $i$  ranges over all of the countries included in the third set of countries. The subscript  $j$  ranges over all the 36 countries included in the second set. Again  $\sum_j W_{ij} = 1$ .

Here again, the data on trade flows normally refer to 1980, and are obtained from Direction of Trade. The formula used to average the bilateral real exchange rate is the same as formula (1).

A large number of ad hoc adjustments have been made to the trade flows of countries in this third group to enhance the relevance of the results. Exports of oil have been excluded from the exports of the countries that are net oil exporters. Similarly, exports of diamonds and gold have been excluded from the exports of Sierra Leone and the Dominican Republic, respectively. In a number of cases, trade statistics have been adjusted to take into account the original source of the goods imported. Foreign travel receipts have been included in cases where such receipts play a major role and where the required data are available (Antigua and Barbuda, Bahamas, Dominica, Grenada, Seychelles, St. Lucia, and St. Vincent).