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March 7, 1986

To: Members of the Executive Board

From: The Secretary

Subject: World Economic Outlook – Staff Studies – The Transmission
           of Economic Influences from Industrial to Developing Countries

        The attached supplement on the transmission of economic influences
from industrial to developing countries provides background material for
the Executive Board discussion on Friday, March 21, 1986 of the World
Economic Outlook.

        Mr. Lanyi (ext. 7401) is available to answer technical or
factual questions relating to this study prior to the Board discussion.

Att: (1)

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World Economic Outlook: Staff Studies

The Transmission of Economic Influences
from Industrial to Developing Countries

. Prepared by the Research Department 1/

(In consultation with other Departments)

Approved by Wm. C. Hood

March 3, 1986

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1/ The authors of this study are David Goldsbrough and Iqbal Zaidi.

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I. Introduction

The impact of the recession of 1980-83 on the economies of developing countries, the effects of high interest rates in financial markets since 1979, and the reduction in new bank lending to developing countries since 1982 have been major topics of recent economic discussion. Nevertheless, the precise mechanisms through which these effects have been transmitted are complex and only partially understood. The purpose of this paper is to review available evidence on the principal links through which changes in macroeconomic performance in the industrial countries influence major economic variables, in particular the rate of economic growth, in developing countries.

These links are numerous: changes in the pace of economic growth and inflation as well as shifts in interest rates and exchange rates in the industrial world can all influence developing countries' economic performance through the markets for goods, services, and migrant labor, as well as through financial markets. These various influences are determined simultaneously. For instance, a shift in the stance of fiscal or monetary policies in industrial countries can alter interest rates and exchange rates and shift the pattern of savings and investment and can also cause changes in aggregate demand that result in price movements and at least short-term variations in output and employment. These developments in industrial countries in turn affect the price and volume of developing countries' exports, the price of their imports, and the volume and terms of their capital inflows. Moreover, the resulting changes in developing countries' economies have a feedback effect on the industrial countries by altering the demand for the latters' exports of goods and capital and by shifting the supply schedule for their imports.

These various effects can be analyzed either by using single equation (reduced-form) estimates and other partial equilibrium studies of individual linkages or by constructing a more comprehensive structural model that takes account of the general equilibrium nature of the links between industrial and developing countries. The former approach is used in this paper, in part because it complements more closely the procedures used to prepare the medium-term scenarios for developing countries in the World Economic Outlook. These scenarios rely heavily on survey estimates prepared by staff members in area departments on the basis of overall environmental assumptions pertaining to the world economy (for example, average GDP growth in industrial countries, prices of manufactured goods imported by developing countries, interest rates on commercial credits, scale of private lending to developing countries, and exchange rates among the major currencies). Comparisons between econometric estimates and estimates obtained from the survey can help give an indication of whether, in the aggregate, individual survey data might be inconsistent with the assumed global environment. The general equilibrium framework of the scenarios is provided in two ways: first, the survey gives a set of

projections (for example, of trade flows, GDP, and the balance of payments) for each country that is internally consistent for that country; second, any inconsistencies between the aggregated survey estimates and the assumed global economic environment is eliminated through iterative adjustments. 1/

Nevertheless, the limitations of the single-equation approach taken in isolation should be borne in mind during the subsequent discussion. In particular, estimates will be biased to the extent that there are significant interactions in the world economy that are omitted from the reduced form and to the extent that variables which would be determined endogenously in a structural model are assumed to be given exogenously in the reduced form. 2/

As a background to the discussion in the rest of the paper, Table 1 provides information on broad trends in the growth rates of output in industrial and developing countries. Several aspects of these trends deserve special mention. First, there does appear to be a rough association between the rates of economic growth in the industrial countries and those of the developing countries. The slowdown in economic growth in the industrial countries between the 1968-72 period and the 1973-80 period was accompanied by a moderate slowdown in developing countries' economic growth. Similarly, the 1981-82 recession in industrial countries and the subsequent recovery in 1983-85 were associated with broadly comparable outcomes in the developing countries.

The relationship between output growth in the two groups is not a precise one, however, and there are clearly many other influences on developing countries' economic growth. This can be seen most clearly when the growth performance of the fuel exporters and non-fuel exporters among developing countries are considered separately. The average rate of economic growth of the non-fuel exporters declined only moderately between the periods 1968-72 and 1973-80, even though industrial country growth slowed more substantially. Also, the recovery in industrial countries' economic growth in 1983-85 was not reflected in renewed output growth in the fuel-exporting countries.

1/ A more detailed discussion of the methodology used in preparing the medium-term scenarios may be found in the 1984 World Economic Outlook, Supplementary Note 7, pp. 157-62. The most recent medium-term scenario is contained in the paper on "The Debt Situation: Prospects and Policy Issues," (EBS/86/43, 2/27/86).

2/ Structural models to analyze various aspects of the interdependence between industrial and developing countries have been constructed by, among others, Hicks et al.(1976), Sachs and McKibbin (1985), and van Wijnbergen (1985).

Table 1. Growth Rates of Real GNP in Industrial
and Developing Countries, 1968-85

(Average annual percentage changes)

	1968-72	1973-80	1981-82	1983-85
GNP of industrial countries	4.4	3.0	0.5	3.3
GNP of developing countries	6.8	5.3	1.9	2.8
By analytical group				
Fuel exporters	9.7	5.3	0.4	-0.2
Non-fuel exporters	5.9	5.3	2.6	4.4
Exporters of manufactures	5.4	5.2	4.8	7.4
Primary product exporters	5.7	5.0	-0.7	2.2
Service and remittance countries	5.1	4.7	2.9	2.7
By area:				
Africa	7.3	3.3	1.2	0.6
Asia	4.8	5.7	5.2	7.1
Europe	6.5	4.8	2.3	2.3
Middle East	10.5	5.1	-1.0	-0.3
Western Hemisphere	6.3	5.5	--	1.2
By financial criteria				
Capital importing countries	6.3	5.3	2.5	3.5
Market borrowers	7.2	5.5	1.2	1.7
Official borrowers	3.6	3.9	2.5	2.5
Countries with recent debt-servicing problems	6.1	5.0	0.6	0.9
Countries without recent debt-servicing problems	6.5	5.7	4.6	6.1
By miscellaneous criteria				
Non-oil developing countries	5.6	5.2	2.7	3.9
Fifteen heavily-indebted countries	7.0	5.3	0.1	0.5

A second observation emerging from Table 1 concerns the considerable diversity in the growth performances of different groups of developing countries. Among the non-fuel exporters, those countries for which at least 50 percent of exports were accounted for by manufactures (the "exporters of manufactures") managed to sustain their rate of economic growth during the 1981-82 recession while output stagnated in those countries for which at least 50 percent of exports were accounted for by primary products other than fuels (the "primary product exporters"). The former group also appear to have benefited much more from the recovery in industrial countries during 1983-85. On a geographical basis, the output growth of developing countries in Asia was only moderately affected by the recent recession and has since recovered sharply, whereas the average rates of economic growth of developing countries in Africa, the Middle East, and the Western Hemisphere have been substantially lower during both the recent recession and the recovery phase. There are also substantial variations in growth performance within these groups.

A third observation is the striking divergence between the average growth performances since 1981 of those countries which have and those which have not encountered recent debt-servicing problems. These two groups had broadly similar growth records during the period 1968-80, which suggests that much of the recent sharp decline in output growth in countries with debt-servicing problems is related to those problems and the associated sharp reduction in private capital flows. In this regard, the average rate of economic growth of those countries that rely primarily on external financing from private creditors (the "market borrowers") fell much more sharply between the period 1973-80 and 1981-85 than did the growth of those countries that rely primarily on external financing from official creditors (the "official borrowers").

II. The Transmission of Economic Influences
Through the Markets for Goods and Services

Macroeconomic developments in industrial countries can significantly influence the external current account and output growth of developing countries through their simultaneous effects on relative prices and volumes in foreign trade. The resulting changes in export earnings will, in turn, affect developing countries' growth prospects both in the shorter term, through their impact on the level of aggregate demand and the availability of foreign exchange, and in the longer term, through their effects on the level of investment and the relative size of the export sector.

This section of the paper discusses these various influences, and begins with a review of those characteristics of the trade structure of developing countries that help determine the size and nature of industrial

country influences on the developing world. An important distinction
in this context is between those countries that rely on oil exports for
a substantial proportion of their foreign exchange earnings and those
that do not. The classification of developing countries into fuel
exporters and non-fuel exporters reflects this distinction and will
be used where possible in this section. 1/ However, some econometric
results and some statistical information are only available on the basis
of the alternative analytical categories of oil exporting countries and
non-oil developing countries, and these categories will be used where
necessary.

1. Developing Countries' Foreign Trade: Overall
   Trends and Key Structural Characteristics

Several features of developing countries' foreign trade provide an
important background to any discussion of the transmission of economic
influences through the goods market. First, the industrial countries as
a group represent the major market for developing countries' exports and
supply the major portion of developing countries' imports, despite some
recent decline in their share of developing countries' foreign trade
(Chart 1).

Second, export developments for the fuel-exporting and non-fuel
exporting developing countries, which were broadly similar during 1968-72,
have differed sharply since 1973 because of the wide fluctuations in oil
prices. The total volume of exports of the fuel exporters has declined
substantially since 1973, although, until 1982, this was more than offset
by the rapid increase in export prices (Table 2). The volume of their
exports to industrial countries has fallen even more rapidly than those
to other regions, owing to a sustained decline in energy consumption per
unit of output in industrial countries and to rising domestic production
of energy in some of these countries. Nevertheless, the large increases
in oil prices caused the share of the fuel exporters in total imports by
industrial countries to more than double between the late 1960s and the
early 1980s, although their market share has since fallen as a result of
the drop in oil prices and a continued decline in export volumes (Table 3).

In contrast, the marked slowdown in the rate of growth of the volume
of industrial country imports after 1973 had only a moderate impact on
the growth of total export volumes by the non-fuel exporters; the latter
continued to expand the volume of their exports to the industrial countries

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1/ A detailed description of the various analytical categories is con-
tained in the statistical appendix to the current World Economic Outlook
(SM/86/47, 2/27/86).

Table 2. Developing Countries: Changes in Export Volumes,
Export Values, and Terms of Trade, 1968-85

(Average annual percentage changes 1/)

	Average 1968-72	Average 1973-80	Average 1981-82	Average 1983-85	Average 1968-85
Developing countries					
Export volume	7.9	2.4	-7.0	3.7	2.6
Export unit value 2/	4.0	24.2	--	1.9	11.5
Export value	12.3	27.9	-7.0	1.7	14.5
Terms of trade	0.8	8.3	0.9	-0.5	3.8
Purchasing power of exports	8.8	10.9	-6.2	3.2	6.6
Fuel exporters					
Export volume	7.5	0.1	-15.8	-1.8	-1.3
Export unit value 2/	5.9	36.4	3.9	-2.7	17.7
Export value	14.6	36.5	-12.5	-4.5	16.1
Terms of trade	3.1	21.5	5.8	-1.6	10.5
Purchasing power of exports	10.8	21.6	-10.9	-3.4	9.0
Non-fuel exporters					
Export volume	8.1	6.2	3.6	7.5	6.6
Export unit value 2/	2.6	14.9	-4.3	-1.4	6.6
Export value	11.4	22.1	-0.8	5.9	13.7
Terms of trade	-0.4	-1.0	-4.0	0.1	-1.0
Purchasing power of exports	7.7	5.1	-0.5	7.6	5.5
Memorandum					
World trade					
Volume	9.5	5.2	-0.5	4.7	5.6
Unit value 2/	4.1	16.1	-2.8	-2.9	7.3
Industrial country imports					
Volume	10.0	4.1	-0.8	7.6	5.3
Unit value 2/	4.1	16.1	-3.9	-3.0	7.0

1/ Compound annual rates of change.
2/ In U.S. dollar terms.

CHART 1

DEVELOPING COUNTRIES
DESTINATION OF EXPORTS AND ORIGIN OF IMPORTS, 1967-1984

(In percent)

DESTINATION OF EXPORTS
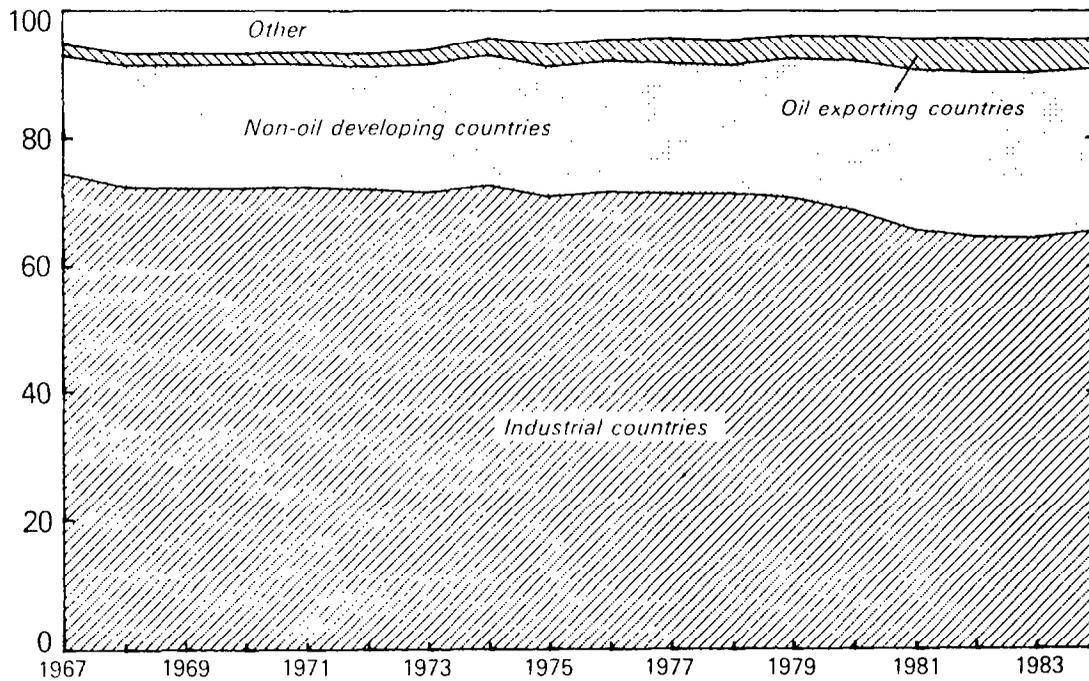
ORIGIN OF IMPORTS
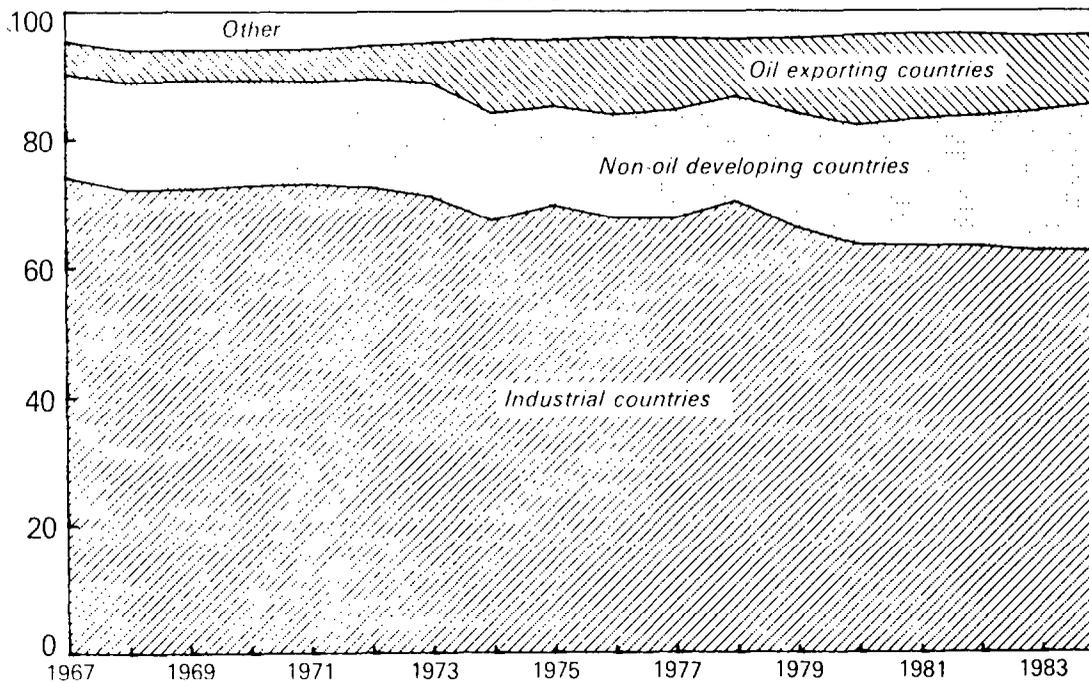
Table 3. Industrial Countries' Imports From Developing
Countries: Changes in Import Values, Import Volumes
and Import Market Shares, 1968-84 1/

(Average annual percentage changes, unless otherwise indicated)

	Average 1968-72	Average 1973-80	Average 1981-82	Average 1983-84	Average 1968-84
Value of industrial countries' imports	14.5	20.9	-5.3	3.9	13.4
of which from:					
Developing countries	13.6	26.7	-9.0	0.4	14.8
Fuel exporting countries	15.9	32.7	-14.5	-7.1	16.1
Non-fuel exporting countries	12.1	20.8	-3.8	10.8	13.9
Volume of industrial countries' imports	10.0	4.1	-0.8	9.0	5.8
of which from:					
Developing countries	8.5	0.2	-8.6	5.1	2.0
Fuel exporting countries	9.3	-3.1	-15.8	-2.8	-1.2
Non-fuel exporting countries	8.1	5.5	1.3	13.3	6.6
Share of developing countries in total industrial country imports (value terms, level in percent)	22.1	29.4	30.9	28.2	27.3
Fuel exporting countries	8.2	16.2	17.6	13.3	13.7
Non-fuel exporting countries	13.9	13.2	13.3	14.9	13.6

1/   All values are in terms of U.S. dollars.

more rapidly than the total volume of industrial country imports, and also continued to expand their exports to other developing countries. Between the periods 1968-72 and 1973-80, the average annual growth rate of industrial country imports fell from 10 percent to 4 percent, but the growth rate of total export volumes by the non-fuel exporters slowed only moderately from around 8 percent to about 6 1/4 percent (Table 2). This trend has continued through the recent recession and recovery. 1/ However, for most of the period since 1973, the purchasing power of these exports has been adversely affected by a declining terms of trade.

Third, the commodity composition of developing countries' foreign trade, especially their exports, has shifted considerably over time. The share of manufactures in developing countries' exports has increased markedly since the mid-1960s, while import substitution and the growing cost of fuel imports have contributed to a moderate decline in the share of manufactures in their total imports (Table 4). By 1980, manufactured exports accounted for almost 60 percent of the total exports of capital-importing developing countries, which was not much below the 69 percent share of manufactures in total world trade (Appendix Table I). Developing countries in Europe and in Asia now export mainly manufactures; in 1980, around four-fifths and two-thirds, respectively, of their total exports consisted of manufactures. Nevertheless, most low-income economies other than China and India still rely on non-fuel primary commodities for the major part of their export earnings; this group includes many countries in Sub-Saharan Africa. These commodities still represent over half of all exports by developing countries in the Western Hemisphere.

These variations in commodity composition over time and across countries have important implications for the effects on developing countries of economic growth in the industrial world. Apart from fuels, the fastest growing component of industrial country imports since the 1960s has been manufactures (Table 5). Those developing countries that were well-placed to take advantage of this growing demand for manufactures have achieved substantially higher rates of export growth. Thus, during 1973-84, the volume of exports to industrial countries from the group of exporters of manufactures grew at an average annual rate of 10.8 percent, while the export volume of the group of primary product exporters grew at a rate of only 3.9 percent (Table 6).

In addition to their role as demanders of imports, industrial countries as a group are also large exporters of primary commodities. Indeed, their share of total world exports of non-fuel primary

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1/ A notable exception was in 1985, when growth in the export volumes of the non-fuel exporters lagged behind the growth in industrial country import volumes (at around 3 1/2 and 4 3/4 percent, respectively).

Table 4. Commodity Composition of Foreign Trade of
Developing Countries, 1965 and 1982 1/

(Percentage shares)

Exports	1965			1982		
	Fuels, Minerals & Metals	Other Primary Commodities	Manufactures	Fuels, Minerals & Metals	Other Primary Commodities	Manufactures
Low-income economies	11	65	24	20	30	50
(excluding China and India)	(12)	(78)	(10)	(15)	(55)	(30)
Middle-income oil importers	19	57	24	13	27	60
Middle-income oil exporters	60	34	6	79	12	9
High-income oil exporters	98	1	1	96	--	4

Imports	Fuels	Other Primary Commodities	Manufactures	Fuels	Other Primary Commodities	Manufactures
Low-income economies	5	29	66	18	28	54
(excluding China and India)	(5)	(24)	(71)	(24)	(20)	(56)
Middle-income oil importers	8	28	64	26	16	58
Middle-income oil exporters	6	22	72	10	19	71
High-income oil exporters	2	27	71	2	15	83

Source: World Bank, World Development Report, 1984, Tables 10 and 11, pp. 192-95.

1/ The classification of countries is that followed by the World Bank in the World
Development Report. Low-income economies are those which had a per capita GNP of less
than $400 in 1983. The groups low-income economies and middle-income oil importers
combined are broadly equivalent to the category of non-fuel exporters.

Table 5. Commodity Composition of Imports by
Industrial Countries, 1965 and 1982

(Percentage shares)

	1965	1982
Fuels	11	26
Non-fuel primary commidities	39	19
Manufactures	50	55
Total	100.0	100.0

Source: World Bank, World Development Report, 1984, Table 11, p. 195.

Table 6.   Implied Income Elasticities for Imports: Industrial Countries, 1973-84

(Average annual percentage changes, unless otherwise indicated)

	All Industrial Countries			United States			Japan			Europe		
	Average 1973-80	Average 1981-82	Average 1983-84	Average 1973-80	Average 1981-82	Average 1983-84	Average 1973-80	Average 1981-82	Average 1983-84	Average 1973-80	Average 1981-82	Average 1983-84
Real gross national product	3.0	0.5	3.6	2.8	-0.3	5.0	4.4	3.4	4.1	2.7	0.1	1.8
Volume of total imports	4.1	-0.3	9.0	3.2	2.6	21.5	4.2	-1.5	5.7	4.0	-1.6	4.3
of which from:												
Developing countries 1/	0.2	-8.6	5.1	3.8	-7.7	15.8	4.5	-4.4	3.6	-1.2	-11.6	-1.1
Fuel exporters 1/	-3.1	-16.0	-2.8	1.7	-19.9	4.4	-0.4	-10.4	0.9	-6.1	-17.1	-8.2
Non-fuel exporters 1/	5.5	1.3	13.3	6.2	8.1	24.4	6.6	5.4	15.9	3.6	-4.5	5.9
Primary product exporters 1/	2.9	0.5	9.4	4.6	4.5	18.5	3.8	3.8	7.4	1.9	-1.8	4.1
Exporters of manufactures 1/	9.3	2.9	18.8	8.4	12.7	31.7	10.3	4.7	12.7	9.4	-7.0	6.8
Service and remittance countries 1/	8.2	-3.6	10.9	8.3	-5.4	9.1	0.2	10.2	20.8	9.3	-3.8	10.4
Apparent income elasticity 2/												
Of total imports	1.3	-1.4	2.5	1.1	-8.7	4.3	1.0	-0.4	1.4	1.5	-16.0	2.4
Of imports from non-fuel exporters	1.8	2.6	3.7	2.2	-27.0	4.9	1.5	1.6	3.9	1.3	-45.0	3.3

1/   Deflated by the index of export unit values for each group's total exports.
2/   Average growth rate of industrial country imports from each developing country group divided by the average growth rate of real GNP of the industrial country.

commodities has grown over time and, in 1980, they accounted for 69 per-
cent of all such exports by industrial and developing countries combined
(Appendix Table II). At the level of aggregation of the single-digit
SITC groups, the export market shares of industrial countries were larger
than those of developing countries for all categories except beverages
and tobacco and fuels. Consequently, those developing countries that
export primary products similar to those produced by industrial countries
will be strongly affected by developments, such as changes in domestic
agricultural pricing policies, that affect the volume of industrial
country primary production and/or exports.

Finally, a fourth key feature of developing countries' foreign trade
is the wide variations in the importance of different industrial country
markets for the various regional groups of developing countries. If devel-
oping country exports consisted mainly of relatively homogeneous primary
commodities, and if there were no significant trade barriers against such
commodities, these regional variations in the direction of trade would
not be of great importance. Divergent movements in the growth rates or
real exchange rates of different industrial countries would cause changes
in the demand and hence in the world price of various commodities, and
each developing country supplier would face the same price changes, irres-
pective of the destination of their exports. The resulting change in
the volume of their exports would depend on the domestic supply responses
to these price changes. In practice, however, a large share of developing
country exports consists of relatively non-homogenous manufactures for
which prices can vary between markets and between suppliers. In addition,
some of the industrial country markets for certain primary product exports
of developing countries--such as sugar, grains, and meat--are in effect
fragmented by various quantitative import restrictions. In such circum-
stances, the growth in demand for a developing country's exports can be
significantly affected by the geographic distribution of those exports.

In this regard, developing countries in Africa and in Europe have
strong links with industrial countries in Europe; almost one half and two
fifths, respectively, of their total exports are sent to that region
(Table 7). In contrast, the principal industrial country markets for
Asian developing countries are the United States and Japan, while devel-
oping countries in the Western Hemisphere rely heavily on the U.S. export
market. These differences in the geographic orientation of exports
were especially important during 1983-84, when the structure of expansion
in the industrial world was unbalanced. The rapid expansion of economic
activity in the United States, together with the appreciation of the U.S.
dollar, caused a large increase in U.S. demand for imports; over the two
years the volume of total U.S. imports rose by 47 1/2 percent (Table 6).
At the same time, the slow pace of recovery in Europe was reflected in
only a moderate increase in import demand; total import volumes grew by
only 9 percent over the two years combined. The consequences of this

Table 7. Destination of Developing Countries' Exports, 1970 and 1984

(As a percentage of total exports)

| | Industrial Countries | | of which: | | | | | | Oil Exporting Countries | | Non-Oil Exporting Countries | | Other Countries 1/ | |
| | | | Europe | | United States | | Japan | | | | | | | |
	1970	1984	1970	1984	1970	1984	1970	1984	1970	1984	1970	1984	1970	1984
All developing countries	72.2	65.0	38.9	25.5	16.9	20.0	10.8	13.4	1.7	4.6	19.4	25.3	6.7	5.1
Africa	68.6	69.1	48.5	46.7	7.2	17.9	6.7	3.4	0.7	1.2	15.5	15.6	15.2	14.1
Asia	66.9	58.1	19.3	13.3	23.4	22.6	19.0	18.6	3.3	4.9	26.3	32.5	3.5	4.5
Europe	46.1	44.9	39.0	37.6	4.3	6.0	0.7	0.7	1.9	12.4	17.4	14.9	34.6	27.8
Middle East	77.2	59.5	53.2	29.3	3.2	6.0	15.2	22.8	1.4	3.9	11.8	28.9	9.6	7.7
Western Hemisphere	76.3	70.7	31.3	22.2	35.4	40.4	7.1	5.2	0.5	3.7	20.7	20.8	2.5	4.8
Oil exporting countries	84.3	65.7	54.4	28.6	10.1	12.7	15.8	22.5	0.2	2.1	15.0	27.5	0.5	4.7
Non-oil exporting countries	67.0	59.3	33.5	23.9	19.3	23.7	9.1	8.8	2.1	5.8	20.4	24.5	10.5	10.4

Source: International Monetary Fund, Direction of Trade, various issues.

1/ Derived as a residual. Includes exports to U.S.S.R., Eastern Europe, etc., and exports to countries or areas not specified.

uneven expansion for the different regional groups of developing coun-
tries can be seen by calculating the weighted average growth rates of
real GNP and import volumes in the industrial countries, using the direc-
tion of exports of the regional groups of developing countries as weights
(Table 8). During the three-year period 1983-85, developing countries in
the Western Hemisphere faced an average industrial country import market
that grew by some 3 to 5 percentage points per annum faster than did the
average industrial country import market faced by African, European or
Middle Eastern developing countries, whereas the differences during the
1973-80 had been relatively minor.

2. Transmission of economic influences through changes in prices

Developments in industrial countries can cause shifts in the demand
and supply on world markets of goods that are exported or imported by
developing countries, thereby causing simultaneous changes in both prices
and volumes. Most empirical studies of these influences on developing
countries' trade flows have concentrated on the demand relationships for
developing countries' exports and imports. 1/ In these studies, supply
relationships have been handled typically by the assumption of infinite
price elasticities of supply. While this assumption may be reasonable
for the case of the world supply of imports to individual developing
countries (or even to groups of developing countries, if they represent a
small part of the total world market), it appears less reasonable for the
supply of exports from developing countries. When the price elasticity
of export supply is not infinite, an upward shift in demand (due perhaps
to a rise in economic activity in the industrial countries) will result
in a rise in both the price and volume of developing country exports. In
such circumstances, estimates of the impact on developing countries'
export earnings of, say, higher industrial country income that were based
on single-equation estimates of demand side relationships would tend to
underestimate the price response and overestimate the volume response. 2/
This should be borne in mind during the following discussion.

There have been relatively few studies, however, of developing coun-
try exports that use simultaneous equation models comparable to those used
for industrial country exports, in large part because of the difficulties
involved in specifying separate supply relationships. Exceptions include
the work by Bond (1985 and 1986) and various studies on the determinants
of commodity price movements, including those by Chu and Morrison (1984
and 1986) and Holtham et al. (1985). Results from these two sets of
studies are used later in this section.

1/ Such studies include those of Rhomberg (1968), Deppler and Ripley
(1978), Houthakker and Magee (1969), and Khan (1974).

2/ The volume response is overestimated because the downward effect on
the quantity demanded due to higher export prices is omitted.

Table 8. Growth of Industrial Country Markets Weighted by the
Direction of Exports of Developing Country Regional Groups, 1973-85 1/
(Average annual percentage changes)

	Average 1973-80	Average 1981-82	Average 1983-85
Industrial country real GNP			
Africa	2.79	0.19	2.56
Asia	3.03	0.98	3.68
Europe	2.69	0.01	2.33
Middle East	3.30	1.32	2.97
Western Hemisphere	2.74	0.07	3.51
Industrial country volume of total imports			
Africa	4.53	-1.00	7.13
Asia	4.31	--	8.54
Europe	4.27	-1.65	6.46
Middle East	4.50	-1.53	5.13
Western Hemisphere	4.22	0.13	10.89
Industrial country volume of non-oil imports			
Africa	0.12	0.91	8.27
Asia	6.74	2.49	10.17
Europe	5.91	-0.03	7.57
Middle East	7.90	0.94	6.97
Western Hemisphere	5.30	1.92	12.06

1/ This table shows the growth in real GNP, total import volumes, and non-oil import volumes in the industrial countries weighted by the direction of exports for each developing country group. The weights are based on 1984 exports.

Although prices and volumes are obviously determined concurrently, it is useful for some purposes to discuss them separately in considering the transmission of economic influences from industrial to developing countries. The remainder of this sub-section considers, first, the effects of macroeconomic developments in the industrial countries on the world prices of broad commodity groups, and second, the resulting changes in developing countries' terms of trade. The next sub-section discusses the volume effects.

a.   Nominal and real commodity prices

Movements in the prices of goods in world trade since the late 1960s are summarized in Table 9 and in Chart 2. The prices of non-oil primary commodities have shown large short-term fluctuations in response to shifts in both demand and supply factors but, over the period 1968-85, have tended to increase at a slower average rate than the prices of manufactures exported by industrial countries. 1/ Among the factors affecting non-oil primary commodity prices have been, on the demand side, the level of economic activity, interest rates, and rates of inflation in industrial countries and, on the supply side, various changes in industrial country policies affecting levels of domestic production, particularly for agricultural commodities. 2/

A number of recent empirical studies have confirmed that, when supply conditions are relatively stable, a decline in the level of economic activity in industrial countries exerts a downward influence on the prices of non-oil primary commodities (Table 10). 3/ Although estimates of the exact size of the cyclical effect have varied, a broad consensus estimate might indicate that the elasticity of commodity prices with respect to industrial production in the industrial countries is around 2. Substantially higher estimated elasticities are obtained by Fishlow (1985) and

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1/ More detailed discussions of the factors underlying the recent movements in non-oil primary commodity prices are contained in World Economic Outlook: Supplementary Notes, SM/86/48, February 28, 1986. Some of the empirical studies referred to in the following paragraphs are also discussed in the May 1983 World Economic Outlook, pp. 154-159.

2/ One example of the impact of agricultural supply policies occurred in 1983. The United States, a major producer and exporter of food commodities, implemented an acreage reduction program for many agricultural crops which succeeded in reducing production. On top of this, a drought in the United States in the summer of 1983 further reduced production. As a result, world food prices rose by over 11 percent in 1983.

3/ In the remainder of this section, non-oil primary commodities are referred to as primary commodities or commodities.

Table 9.   Movements in Commodity Prices, 1968-85
(Average annual percentage changes) 1/

	Average 1968-72	Average 1973-80	Average 1981-82	Average 1983-84	1985	Average 1968-85
Non-oil primary commodity prices	3.5	13.1	-12.0	5.4	-12.2	5.0
Food	5.2	13.1	-13.1	7.0	-18.7	5.1
Beverages	3.6	15.5	-10.7	11.8	-11.6	5.9
Agricultural raw materials	4.2	11.7	-10.7	4.1	-12.2	4.7
Metals	0.6	13.1	-13.5	-1.7	-2.8	3.8
Oil 2/	6.6	38.2	2.6	-7.0	-4.4	16.6
Manufactures 3/	4.7	12.3	-3.7	-3.5	1.0	6.1
Memorandum:				.		
Non-oil primary commodity prices deflated by price of manufactures	-1.1	0.7	-6.1	9.2	-13.1	-1.0

1/   Compound annual rates of change.   Nominal prices are in terms of U.S. dollars.
2/   Oil export unit values of the oil exporting countries.
3/   United Nations export unit value index for the manufactures of the developed countries.

Table 10. Estimates of the Elasticity of Real Non-Oil
Primary Commodity Prices with Respect to
Industrial Countries' Real Economic Activity

Investigator	Time Period	Level of Aggregation	Industrial Countries' Economic Activity Variable	Estimated Elasticity
Chu and Morrison (1984) (quarterly data)	1958-82	Non-oil primary commodities	Industrial production	1.7**
	1958-71			0.7**
	1972-82			2.2*
Chu and Morrison (1985) (quarterly data)	1962-82	Non-oil primary commodities	Industrial production	2.0 1/
	1962-82	Food		1.3
	1962-82	Beverages		1.6
	1962-82	Agricultural raw materials		3.4**
	1962-82	Metals		2.6**
Dornbusch (1986) (quarterly data)	1960-84	Non-oil primary commodities	Industrial production	1.0**
Fishlow (1985) (annual data)	1977-84	Non-oil primary commodities	GNP	3.4
van Wijnbergen (1985) (annual data)	1970-84	Primary commodities, excluding fuel	GNP 2/	4.5

Note: Although the form of the estimating equation varies, all of the above elasticities estimate the effect on real commodity prices of cyclical fluctuations in the rate of output growth. All of the equations either use primary commodity prices deflated by the price of manufactures as the dependent variable, or include an inflation variable among the right-hand terms.

1/ Derived as a weighted average of the coefficients for individual groups.
2/ Derived from an estimating equation linking real commodity prices and the unemployment rate in the OECD, together with the assumption that a one percentage point increase in GNP is equivalent to a 0.3 percent decline in the unemployment rate.

CHART 2

NON-FUEL EXPORTING DEVELOPING COUNTRIES

TRENDS IN REAL NON-OIL PRIMARY COMMODITY PRICES AND IN THE TERMS OF TRADE, 1967-85

(Indices, 1980=100)

Real non-oil primary commodity prices[1]

Terms of trade of exporters of manufactures

Terms of trade of non-fuel exporters

Terms of trade of primary product exporters
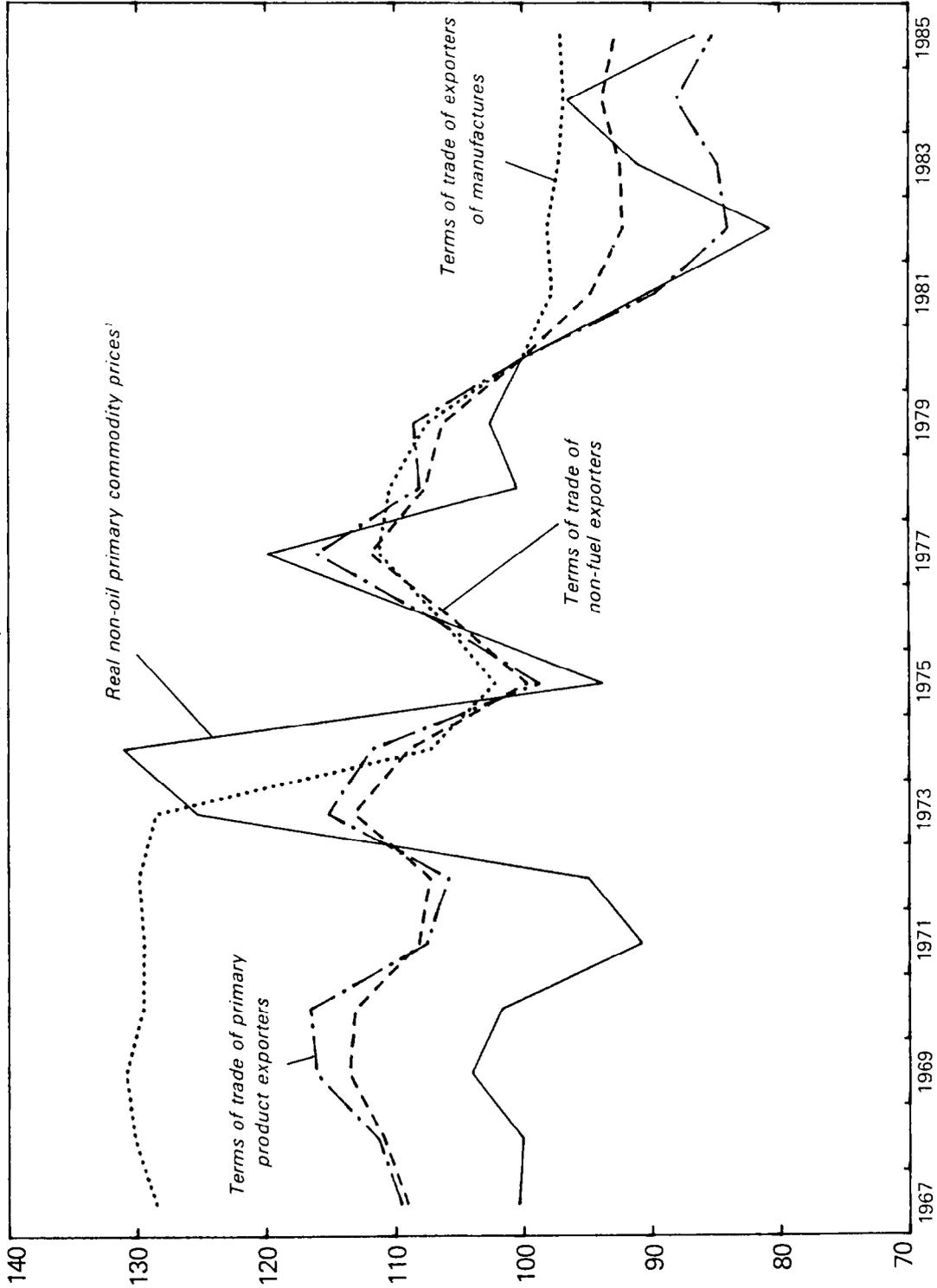
[1]Index of market prices for non-oil primary commodities deflated by the export unit value index of the manufactures of industrial countries.

by van Wijnbergen (1985), but the former is based on a very short time period and the latter is derived indirectly, by estimating the relation-ship between real commodity prices and unemployment in the industrial countries, and then making use of the association between GDP growth and unemployment in the industrial countries--a relationship which may have changed substantially during the last decade. The studies by Chu and Morrison also indicate that the elasticity was substantially higher during the 1972-82 period than for the 1958-71 period; this may partially account for the lower elasticity estimated by Dornbusch (1968) for the period 1960-84. There is also evidence that the prices of metals and agricultural raw materials are more sensitive to cyclical fluctuations in industrial production than are the prices of food and beverages. This is to be expected, since the former groups of commodities are more heavily used as industrial inputs.

All of these estimated elasticities, however, refer to the sensitivity of commodity prices to relatively short-term, cyclical variations in the rate of output growth in industrial countries. The elasticity of response of real commodity prices to a shift in the longer-term, trend rate of economic growth in industrial countries would probably be lower. Not only would the share of stockbuilding--which has a high raw materials component--in the change in total demand be lower in the longer-term, but the supply response would also be greater. In this regard, Holtham et al (1985) have estimated reduced-form equations for the determination of commodity prices in which, by construction, all commodity prices (other than those for beverages) eventually return to their trend levels following a deviation of industrial country GDP from its trend growth path. Their results (estimated semiannually over the period 1967-84) suggest that such a deviation would cause commodity prices to rise, with the peak response occurring around the fourth semester (i.e., up to two years after the initial rise in GDP); the price response then fades and virtually disappears after five to six years. Their results also confirm Chu and Morrison's conclusion that cyclical fluctuations in the industrial countries have a bigger impact on the prices of metals and agricultural raw materials than on the prices of food. A one percentage point deviation in industrial country GDP from its trend is estimated to cause, at the peak, about a 2 percent increase in the former prices, but a smaller increase in the latter prices. 1/ Beverage prices are estimated to be permanently affected by the deviation of GDP from its trend--with prices about 3 percent higher as a result of a 1 percentage point deviation industrial country growth--but this may simply reflect the greater dif-ficulties in empirically estimating the lags in the price responses for these commodities, owing to the long lags in supply response for the crops involved.

1/ These estimated effects are based on the UNCTAD commodity price indices.

As can be seen from Chart 2, the three most recent periods of reduced economic activity in industrial countries--in 1971, 1975 and 1981-82--have broadly corresponded with periods of low real commodity prices. However, there are clearly many additional influences on commodity prices; their real level fell substantially in both 1978 and in 1985, when the level of economic activity in the industrial world was rising. 1/ One factor underlying the most recent weakness of commodity prices has been the geographic imbalance in industrial country growth rates. The European industrial countries account for more than one half of total world imports of non-oil primary commodities (Table 11). 2/ Consequently, their relatively slow economic growth in recent years has dampened the demand for commodities, and this has been less than fully offset by the more rapid growth of output in the United States and Japan.

Inflation in industrial countries influences nominal commodity prices both by increasing the price of substitutes in importing countries and by pushing up the costs of production of those primary commodities exported by developing countries. Chu and Morrison (1984) find that a one percent increase in the wholesale price index in industrial countries was associated with an increase in commodity prices of slightly greater than one percent. 3/ Of course, such a close relationship is not surprising since components of the two indices are overlapping; moreover, the direction of causation is probably two-way, since changes in commodity prices may also influence industrial country wholesale prices.

The level of interest rates on world financial markets could be expected to have several counteracting influences on commodity prices. High real interest rates discourage stock-holding demand for commodities, which would exert a downward influence on prices, but also tend to raise production costs, which would cause prices to rise. The unusually high level of real interest rates during the 1981-82 recession probably contributed to the sharp decline in commodity prices in that period by encouraging stock liquidation, and the persistence since then of relatively high real rates may have dampened the recovery in commodity prices

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1/ Both these downturns in prices appear to have been due in large part to supply factors. For instance, see Chu and Morrison (1985).

2/ To the extent that world markets for primary commodities are relatively homogeneous and free from trade barries, it is the shares of the different industrial countries in total world consumption (and production) of these commodities that determines the impact on prices of changes in these countries' GDP. It has already been argued, however, that the markets for a number of primary commodities are fragmented.

3/ Chu and Morrison (1984), op. cit., Table 6, p. 117. All prices are expressed in terms of U.S. dollars.

Table 11. Non-Oil Primary Commodities and Manufactures:
The Structure of World Trade 1/

(In percent; 1979-81 average)

	Non-Oil Primary Commodities		Manufactures	
	Imports	Exports	Imports	Exports
World	100	100	100	100
Industrial countries	79	68	74	87
United States	12	19	14	14
Europe	51	33	53	58
Japan	14	1	3	12
Other	2	15	4	3
Developing countries	21	32	26	13
Non-oil developing countries	16	29	19	12
Oil exporting countries	5	3	7	1

1/ Based on the United Nations, International Trade Statistics, Series D. Some processed primary commodities such as copper, tin, aluminum and coffee concentrates are regarded as primary commodities, while all the other processed or semi-processed goods are regarded as manufactures.

for the same reason. Most econometric studies have not detected a strong, statistically significant impact of real interest rates on the prices of non-oil primary commodities as a group. There is, however, some evidence of a moderate inverse relationship between interest rates and the prices of agricultural raw materials and metals, demand for which is more affected by stockbuilding than that of other commodity groups (Chu and Morrison (1984); Holtham (1985)).

The relationship between commodity prices and exchange rates has been of particular importance in recent years because of the substantial movements in the U.S. dollar against other major currencies. Two aspects of the relationship can have a direct impact on developing countries' welfare. First, the greater the extent to which a dollar depreciation leads to a general increase in the dollar prices in world trade, the greater is the decline in developing countries' debt and debt service ratios, since around four fifths of developing country debt is denominated in U.S. dollars. Second, some observers have argued that a change in the dollar exchange rate affects the price of primary commodities relative to the price of manufactures.

These effects can be investigated using two alternative approaches. First, the estimated price elasticities of export supply and import demand for various groups of primary commodities and manufactures, together with information on the share of the United States in world trade of the goods concerned, can be used to calculate the impact of a change in the U.S. dollar exchange rate on the prices of primary commodities and manufactures. Second, a direct econometric analysis of the relationship between nominal and real commodity prices and the U.S. dollar exchange rate can be undertaken.

Beginning with the first approach, the effect of a dollar depreciation on the dollar price of goods in world trade depends on the supply and demand elasticities for those goods in different countries and on market shares. If export supply and import demand elasticities are constant across countries then, other things being equal, the impact of a dollar depreciation on the dollar price of a good will be larger with each of the following: (i) the smaller is the U.S. share in world trade of that good; (ii) the smaller are export supply elasticities, and (iii) the smaller are import demand elasticities. 1/ The U.S. share in the world trade of primary commodities as a group is fairly small and also not that

1/ This is on the basis of an imperfect substitutes model of world trade. A simple theoretical model describing how a change in the exchange rate among industrial countires affects the price of competitively traded commodities can be found in "Effects of Exchange Rate Changes in Industrial Countries," Supplement 1 to SM/86/49, March 3, 1986, Appendix I.

different from its share of world trade in manufactures (Table 11).
Hence, in the absence of other factors—such as differences in price
elasticities of export supply and import demand across countries and com-
modities—one would expect, on a priori grounds, that a given percentage
dollar depreciation would raise the dollar prices of both primary commo-
dities and manufactures by a relatively large fraction of the depreciation
and that the relative price of primary commodities to manufactures would
not be greatly altered. An analysis using U.S. market shares and esti-
mated price elasticities of supply and demand for various broad commodity
groups suggests that a 10 percent depreciation of the dollar would raise
the dollar prices of both non-oil primary commodities and manufactures by
between 6 and 7 percent. 1/ A similar exercise suggests that a 10 percent
dollar depreciation would raise the dollar price of fuels by around
3 1/2 percent.

Nevertheless, the effect of a dollar depreciation on relative prices
could be considerably larger at a more disagregated level, since the rela-
tive importance of the United States in world markets varies substantially
across commodities. Indeed, a dollar depreciation could tend to reduce
the relative price in world trade of some primary commodities, compared
to the price of other traded commodities and manufactures. For instance,
U.S. production of agricultural products such as coarse grains, wheat, and
fats and oils is a substantial proportion of the world total. Consequently,
a dollar depreciation might be expected to have a significant downward
effect on the world prices of these commodities relative to the price of
other goods in world trade. 2/

1/ These estimates are based on the assumption that those developing
countries that are pegged to the U.S. dollar depreciate their currencies
along with the dollar, that those countries which peg their currencies to
the French franc continue to do so, and that all other developing countries
maintain unchanged their effective exchange rates vis-à-vis all indus-
trial country currencies combined. The values of the price elasticities
of supply and demand used to derive these results are those estimated by
Bond (1986). The dollar price of manufactures is measured by the average
unit value of the industrial countries' exports of manufactures.
2/ A depreciation of the U.S. dollar would raise the price of these
commodities relative to the price of non-traded goods in the United States.
The resulting output increase and consumption decrease would tend to force
down the world trade price of these commodities relative to other traded
goods because of the large proportion of supply on world markets for these
commodities that is accounted for by U.S. exports. The size of the rela-
tive price change would depend on the relevant supply and demand elasticities
with respect to price.

Additional evidence on these issues is provided by econometric analyses of the determinants of the dollar prices of primary commodities and manufactures. Analyses of quarterly data covering the period from the early 1970s to the early 1980s find that the elasticity of dollar prices of primary commodities with respect to the exchange rate of the U.S. dollar vis-à-vis other major currencies is around -3/4; an elasticity of similar magnitude is obtained for the dollar price of manufactures. 1/2/ These results confirm the above finding regarding the lack of a strong impact of changes in the U.S. dollar exchange rate on the relative price of primary commodities vis-à-vis manufactures.

To a considerable extent, of course, the question of whether changes in the U.S. dollar exchange rate affects 'real' commodity prices depends on the price index used to deflate commodity prices. An appreciation of the dollar would tend to lower the price of primary commodities relative to the composite price of U.S. domestic output and raise their price relative to the composite price of domestic output in other industrial countries. In this regard, several econometric studies detect a large and significant negative relationship between the real effective exchange rate of the U.S. dollar and the 'real' price of primary commodities when the latter is derived by deflating commodity prices in current U.S. dollars by the U.S. GDP deflator. However, this relationship reflects, in large part, the effect of a dollar appreciation in raising the relative price of non-traded goods in the U.S. economy. This does not directly affect developing countries' terms of trade since, by definition, developing countries do not purchase U.S. non-traded goods. Nevertheless, the effect of a dollar appreciation or depreciation on the terms of trade of individual developing countries will be strongly influenced by the degree to which their foreign trade is oriented toward the U.S. markets.

Macroeconomic developments in industrial countries will also influence the price of oil. Although the share of industrial countries in total world oil consumption has declined (from 71 percent in 1973 to 57 percent in 1984), changes in industrial country real GNP still have a substantial impact on the total world demand for oil. Most empirical estimates

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1/ Measured by the average unit value of industrial countries' exports of manufactures. The lag in response for manufactures appeared to be somewhat longer than for primary commodities, but took place within a year.

2/ Such econometric estimates are likely to be biased upwards, however, since both prices and exchange rates are really endogenous variables that are simultaneously determined by other, exogenous factors. For instance, a loosening of monetary policy in the United States would be likely both to raise dollar prices and to lead to a depreciation of the dollar exchange rate.

suggest that the elasticity of industrial country demand for oil with respect to real GNP is somewhat below unity, around, say, 0.8. This would indicate that a 1 percentage point decrease in industrial country GNP would lead to a decrease in total world demand for oil of just under 1/2 of 1 percentage point. The response of oil prices to such a change in demand would be strongly affected by the supply policies of the OPEC oil producers, particularly in the short term. If the members of OPEC reduced their oil output levels to match the decline in world demand, then oil prices would remain unchanged, although total oil export earnings would decline because of the reduced export volumes. However, recent experience has shown that the larger is the fall in world demand, and consequently the larger are the cuts in production needed to maintain an unchanged oil price, then the greater is the tendency for production quotas to be exceeded and for the actual oil price to decline as various oil exporting countries offer direct and indirect discounts.

b. Terms of trade

It is evident that the consequences for developing countries' terms of trade of the various shifts in relative prices discussed above will depend on the commodity composition of each country's exports and imports. To illustrate this, rough estimates of the cyclical elasticity of the terms of trade of groups of developing countries with respect to industrial country GNP are given in Table 12. Although the simple estimating equations used to obtain these elasticities are obviously subject to numerous econometric problems, the results do indicate that the terms of trade of those countries that export mainly primary products benefit more from faster growth in industrial countries (and suffer more from slower growth) than do the exporters of manufactures. The terms of trade of the service and remittance countries appear to improve the least, perhaps because their exports are less oriented toward the industrial countries and because most of their exports that do go to the industrial world are destined for the more slowly growing European countries. For the group of non-oil developing countries, the terms of trade elasticity is estimated at 1.7; a similar estimate is derived by van Wijnbergen (1985) using a somewhat different approach.

However, there are grounds for believing that such estimates may be overestimated, since part of the effect attributed to changes in industrial country output may actually be due to other factors omitted in the analysis. In this context, two features of these estimates should be noted. First, they measure the relatively short-term impact; the estimates presented in Table 12 relate changes in the terms of trade to the rate of output growth in industrial countries during the same year. The longer-term impact of faster industrial country growth could be smaller, because demand from stockbuilding would be less important and because supply would have longer to adjust to the increased demand. In this regard,

Table 12. Developing Countries: Estimated Elasticities of Export Volume
and the Terms of Trade with Respect to Industrial Countries' Real GNP, 1967-84

	Estimated Elasticity of Export Volumes	Estimated Elasticity of the Terms of Trade	Implied Elasticity of the Purchasing Power of Exports 1/
By predominant export:			
Fuel exporters	3.9**	-3.7	--
Non-fuel exporters 2/	1.6**	2.3**	3.9
Primary product exporters	1.6**	2.3**	3.9
Exporters of manufactures	2.4**	1.4**	3.8
Service and remittance countries	0.8	0.9**	1.7
By region:			
Africa	3.0**	-0.2	2.8
excluding Algeria and Nigeria	(2.0)*	(1.9)*	(3.9)
Asia	2.7**	1.5**	4.2
Europe	1.5**	0.7**	2.2
Middle East	4.1**	-4.1	--
of which: non-oil countries	(0.9)	(-0.6)	(0.3)
Western Hemisphere	1.5**	1.0	2.5**
By alternative analytical categories:			
Non-oil importing developing countries 2/	1.8	1.7	3.4
Net oil exporters	0.8	1.8	2.6
Major exporters of manufactures	2.7**	1.6**	4.3
Low-income countries 3/	0.6	2.4**	3.0
Other net oil importers	1.1**	1.8**	2.9

Note: Elasticities were estimated from ordinary least square regressions on equations of the forms:

$\Delta \log$ (volume of exports) $= a_0 + a_1 \Delta \log$ (industrial country GNP);

$\Delta \log$ (terms of trade) $= \alpha_0 + \alpha_1 \Delta \log$ (industrial country GNP).

** and * denote significance at the 1 and 5 percent levels, respectively.

1/ Sum of the elasticities for export volumes and the terms of trade.
2/ Elasticities are weighted averages of the elasticities for the analytical subgroups, using 1980 total exports as weights.
3/ Excluding China.

estimates by Cline (1984) on the effect of economic growth in OECD coun-
tries on the terms of trade of selected developing countries suggest that
there may be an initial terms of trade improvement as OECD growth accele-
rates, but that no further improvement occurs once a stable growth rate is
reached. According to his estimates, a 1 percentage point increase in the
rate of industrial country growth would cause, on average, a rise in
developing countries' terms of trade of 1 1/2 percent in the first year
and another 1 1/2 percent in the second year, but the terms of trade would
then remain unchanged unless there was a further change in the rate of
growth in industrial countries. However, the nature of the supply responses
that would generate such a relationship are not clear.

Second, the earlier estimates of the impact of industrial country
growth on the relative price of primary commodities vis-à-vis manufactures,
together with the commodity composition of developing countries' exports
and imports, might suggest somewhat smaller effects on the terms of trade
than those estimated in Table 12. For example, for low-income developing
countries (excluding China and India) manufactures represented about
30 percent of exports and 54 percent of imports in 1982 while the shares
of primary commodities were around 55 percent and 20 percent, respectively
(Table 4). If a 1 percentage point increase in industrial country economic
growth raises the price of primary commodities relative to manufactures
by 2 percent for both exports and imports then (without taking account of
the impact of industrial country growth on the relative price of fuels)
this would imply an increase in this group's terms of trade of the order
of 7/10 of 1 percent. The effect on the terms of trade of other developing
country groups would be even lower, because of the smaller difference
between the share of manufactures in their exports and imports; for
middle-income oil importers, this approach would suggest a terms of trade
effect of only around 1/4 of 1 percent.

It might be argued that these latter estimates tend to underestimate
the terms of trade elasticities because a substantial proportion of manu-
factured exports from many developing countries consists of processed
primary products. Since the value added in processing for these goods is
often relatively small compared to the value of the primary inputs, the
world prices of such manufactured exports could be more strongly influenced
by the prices of the primary inputs than are the prices of manufactures
from industrial countries. Some evidence on the importance of this
factor is provided by an econometric analysis of the elasticity of
developing countries' import and export unit values with respect to the
world prices of various groups of goods (Table 13). The results suggest
that the elasticity of export unit values with respect to the price of

Table 13. Developing Countries: Elasticities of Unit Values
of Imports and Exports with Respect to Prices of Fuels,
Non-oil Primary Commodities, and Manufactures, First
Half 1962 to Second Half 1979

	Non-Oil Developing Countries	Oil Exporting Countries
Elasticity of import unit values with respect to:		
Price of fuels	0.18**	0.02**
Price of agricultural goods 1/	0.25**	0.08**
Price of raw materials 2/	0.17**	0.03*
Price of manufactures 3/	0.41**	0.89**
Elasticity of export unit values with respect to:		
Price of fuels	0.08**	1.22**
Price of non-oil primary commodities 4/	0.54**	--
Price of manufactures	0.41**	--

Source: World Trade Model. See Spencer (1984b).

Note: Estimated elasticities were derived from regressions for semi-annual data on equations of the form:

Δ log (import unit value) = a_1 Δ log (price of fuels) + a_2 Δ log (price of agricultural goods) + a_2 Δ log (price of raw materials) + a_4 Δ log (price of manufactures)

Only the long-run elasticities are reported. ** and * represent significance at the 1 and 5 percent levels, respectively.

1/ Unit values of industrial countries' exports of agricultural goods (SITC 0 + 1).
2/ Unit values of world trade in raw materials (SITC 2 + 4).
3/ Unit values of industrial countries' exports of manufactured goods (SITC 5 - 8).
4/ World spot prices for non-oil primary commodities, weighted by the commodity composition of the exporting region.

manufactures is as important as the corresponding elasticity for import
unit values. This in turn would seem to indicate that the effect on
non-oil developing countries' terms of trade of faster industrial country
growth is substantially smaller than that suggested by the directly
estimated elasticity of 1.7. 1/ Consequently, that estimate should perhaps
be regarded as an upper limit of the likely true elasticity. 2/

Finally, a further econometric analysis covering the period 1967-84
finds that an appreciation of the real effective exchange rate of the
U.S. dollar does not result in a significant deterioration in the terms
of trade of either the group of non-oil developing countries or the group
of non-fuel exporting countries. 3/ A similar investigation suggests
that, on the basis of historical experience, the terms of trade of the
fuel exporters among developing countries did improve when the U.S. dollar
appreciated. However, this relationship probably reflects the attempts by
certain oil exporting countries to maintain a dollar export price for oil
unchanged for quite long periods. Consequently, this past experience may
not be a good guide to the future relationship between the exchange rate
of the U.S. dollar and the terms of trade of the fuel exporters.

1/ Repeating the earlier analysis, but replacing data on the commodity
composition of foreign trade by the estimates of Table 13, a 2 percent
increase in the price of non-oil primary commodities relative to manufac-
tures with the price of fuel assumed unchanged would raise the terms of
trade of non-oil developing countries by 0.24 percent [2*(0.54 - 0.25 -
0.17)].

2/ One additional reason for the wide variation in estimates of the
impact on developing countries' terms of trade of industrial country growth
given by the two approaches discussed in the text is the high level of
aggregation involved. Non-oil developing countries as a group are large
net importers of some primary commodities for which the industrial coun-
tries are dominant suppliers. Some of these commodities, particularly
agricultural goods, have been subject to significant protectionist influ-
ences in some industrial countries, which may have caused industrial
country growth to affect their prices differently than those of other
primary products.

3/ The estimated equations were of the form

$$\text{Ln (TOT)} = \underset{(8.57)}{4.36} + \underset{(4.11)}{0.008} \text{ CAPUT} \quad \underset{(0.95)}{-0.084} \text{ Ln (RLEXUS)} \quad \underset{(4.41)}{-0.011t}$$

$$R^2 = 0.83, \quad DW = 1.81, \quad \text{rho} = 0.46$$

where the results reported are for non-oil developing countries. CAPUT
is the GNP-weighted rate of utilization of manufacturing capacity for
industrial countries, RLEXUS is the real effective exchange rate of
the U.S. dollar, and t is a time trend. Figures in brackets are
t-statistics.

3. Transmission of economic influences through changes in volumes

There is ample evidence that a faster growth of real incomes in industrial countries leads to a more rapid growth in their total imports, including those from developing countries. The magnitude of the response of developing country export volumes will depend, among other factors, on their commodity composition and on the relative importance of the industrial countries as markets. Additional factors of importance will be the relative competitiveness of developing countries' exports and the price elasticity of industrial countries' import demand.

The following discussion presents two sets of evidence on the relationship between industrial countries' real incomes and developing countries' export volumes, using the distinction between "marginal" and "average" elasticities. 1/ In the first set, the implied elasticities of changes in export volumes with respect to changes in industrial country GNP are estimated for broad groups of developing countries. These are "marginal" elasticities in the sense that they reflect the percentage point increase in the rate of growth in developing country export volumes that would result from a one percentage point increase in the rate of economic growth in the industrial world. These estimates do not take account of developing countries' supply responses, nor of variations in the geographic direction of trade. In the second set, for a sample of the non-fuel exporters among developing countries, the elasticity of the level of export volumes with respect to the level of real GNP in industrial countries is estimated. 2/ These are "average" (or conventional) elasticities in the sense that they reflect the percentage increase in the level of developing country export volumes that would result from a one percentage point increase

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1/ The "average" (or conventional) elasticity is measured by $\frac{\partial\ (\ln(XVOL))}{\partial\ (\ln(GDP))}$
where XVOL is the volume of developing country exports and GDP is industrial country real GDP. The "marginal" elasticity is measured by:
$$\frac{\partial\ (\Delta\ \ln(XVOL))}{\partial\ (\Delta\ \ln(GDP))}, \text{ i.e., by } \frac{\partial\ (g_x)}{\partial\ (g_{ind})}$$
where g_x is the growth rate of developing country export volumes and g_{ind} is the growth rate of industrial country GNP. Cline (1984), p. 41, and also Fishlow (1985) make use of this distinction. The two elasticities will only be identical if the growth rate of developing country exports is zero when the growth rate of industrial country GNP is zero.

2/ The sample of countries used here is broadly similar to the sample of countries used in the survey exercise conducted as part of the preparation for the medium-term scenario of the World Economic Outlook, but does not include the People's Republic of China.

in the level of real GNP in industrial countries. For each developing
country, the latter index is weighted according to the geographical dis-
tribution of its exports. Also, they take account of supply responses to
the extent that the effects of changes in developing countries' relative
competitiveness on export volumes are included.

The estimated marginal elasticities are shown in Table 12 and
comparable estimates provided in other studies are shown in part A of
Table 14. Three broad conclusions can be drawn. First, the elasticity
of changes in export volumes of non-oil developing countries (and of the
broadly similar group of non-fuel exporters) with respect to changes in
industrial country GNP appear to be within the range 1 3/4 to 2 1/4. A
higher elasticity is used by Cline (1983 and 1984), but this is based
on an estimate for all industrial country imports (with the constant
term adjusted to reflect the higher trend growth of developing country
exports to industrial countries) and is not confirmed by other studies. 1/
Second, Goldstein and Khan's (1982) results indicate that this elasticity
increased between 1963-72 and 1973-80, perhaps because of the increasing
share of manufactures in developing country exports. 2/ However, experi-
ments with sub-periods during the 1970s and early 1980s (not reported in
Table 12) provide no evidence that there has been any further increase
in these elasticities over time. Third, the commodity composition of
developing countries' exports does seem to affect their responsiveness
to changes in industrial country GNP. The exporters of manufactures
recorded an elasticity of 2.4, substantially higher than the elasticity
of 1.6 recorded for primary product exporters. The elasticity estimated
for the service and remittance countries was even lower, perhaps because
of the lesser importance of the industrial country markets for these
countries' exports.

The estimated average elasticities are shown in part B of Table 14.
In general, they are slightly higher than the estimates obtained for the
marginal elasticities, but this probably reflects the use of weighted
GNP indices for the industrial countries which more closely reflect the
pattern of developing countries' export trade. The results generally
confirm the broad conclusions, stated above, on the elasticities of
developing countries' export volumes. 3/ In addition, the relatively
high coefficients obtained for the elasticity of export volumes with
respect to developing countries' real effective exchange rates suggest

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1/ See Cline (1984), footnote 3, p. 41.

2/ The somewhat lower estimated elasticity obtained by Dornbusch for
the period 1960-83 may be due in part to this effect.

3/ The low elasticity of the volume of exports by service and remit-
tance countries with respect to industrial country real GNP is confirmed,
but the number of such countries covered in the sample is limited.

Table 14. Alternative Estimates of the Elasticities of Developing Countries'
Export Volumes with Respect to Real GNP in Industrial Countries' and with Respect
to Developing Countries' Real Effective Exchange Rates

Investigator	Time Period	Level of Aggregation	Estimated Elasticity with Respect to Real GNP or GDP	Estimated Elasticity with Respect to Real Effective Exchange Rates
A. Estimates of Marginal Elasticities				
Cline (1983 and 1984)	1961-81	Non-oil exports of developing countries	3.0 1/	...
Dornbusch (1986)	1960-83	Total exports, non-oil developing countries	1.3* 2/	...
Fishlow (1985)	1977-84	Total exports, non-oil developing countries	1.7	
Goldstein and Khan (1982)	1963-80 1963-72 1972-80	Total exports, non-oil developing countries	1.3* −0.5 2.3*	... ...
This study (See Table 15)	1967-84	Total exports, non-oil developing countries	1.7**	...
van Wijnbergen (1985)	1966-83	Total exports, non-oil developing countries	1.6	...
B. Estimates of Average Elasticities				
Bond (1985)	1967-81	Total exports, non-oil developing countries 3/	2.4 4/	−0.8 4/
This study 5/	1968-84	Total exports, non-fuel exporters	2.3 4/	−0.6 4/
		Total exports, primary product exporters	2.4**	−0.5**
		Total exports, exporters of manufactures	2.7**	−0.8
		Total exports, service and remittance countries	0.4	−0.7

Note: The estimates of the marginal elasticities were derived from economic investigations
of the relationship between the rate of growth of developing countries' export volumes and
the rate of growth of industrial country GNP in the same year. The estimates of the average
elasticities were derived form econometric investigations of the relationship between the
level of export volumes and the level of industrial country GNP (both in terms of logarithms).

1/ This is derived from an equation of the form $g_x = -3 + 3g_{ind}$ where g_x is the growth rate
of export volumes and g_{ind} the growth rate of industrial country GNP. This implies that the
average elasticity of export volumes with respect to industrial country GNP is 2.0, when
evaluated at an industrial country growth rate of 3 percent.

2/ This is derived from an equation of the form $g_x = 0.9 + 1.3 g_{ind}$. Therefore, at an in-
dustrial country growth rate of 3 percent, it is equivalent to an average elasticity of 1.6.

3/ Based on a sample of 36 countries.

4/ These are weighted averages of the elasticities estimated for analytical sub-groups,
with 1980 exports used as weights.

5/ These estimates are derived from regressions on reduced-form equations similar to
those used by Bond (1985):

$$Ln\ (XVOL) = a_0 + a_1\ Ln\ (WTDGNP) + a_2\ Ln\ (REER) + a_3\ Ln\ (REER_{-1}) + a_4 t$$

where XVOL is export volume from the respective groups of developing countries to the
industrial countries, WTDGNP is industrial countries' GNP weighted by their imports from
each group, and REER is the average export-weighted real effective exchange rate of each
group. Only the results for the long-term elasticity with respect to real effective
exchange rates (i.e., $a_2 + a_3$) are shown in the table. These estimates are based on a
sample of 32 countries.

that broad groups of developing countries, and not just individual developing countries, can expand their shares of industrial country markets by improving their competitiveness.

The effects of changes in industrial country GNP on the exports of the fuel exporters have been largely determined by the singular conditions in world oil markets. The efforts by the members of OPEC to maintain the US dollar prices of their oil exports unchanged for fairly long periods caused them to act as residual suppliers of oil to importing countries for much of the period since 1973. Consequently, the volume of oil exports by these countries has been highly sensitive to fluctuations in economic activity in the industrial world--this is reflected in the high estimated elasticity of 3.9 (Table 12). Also, since the OPEC strategy has caused oil prices to be less affected by short-term, cyclical fluctuations in industrial country output, there has tended to be a negative relationship between changes in fuel exporters' terms of trade and cyclical changes in industrial country GNP. However, the more recent emphasis of the major oil exporting countries on protecting their market shares rather than on maintaining a given price would suggest that changes in industrial country output in the future may have a smaller impact on these countries' export volumes than in the past, but a larger positive impact on their export prices.

Finally, there are no strong reasons for expecting that a shift in the exchange rate of the U.S. dollar relative to the currencies of other industrial countries would, by itself, have a significant effect on the total volume of exports by all developing countries as a group. To be sure, if a significant number of developing countries chose to appreciate or depreciate their own currencies along with the U.S. dollar, then their export volumes would clearly be affected, but such effects would be more appropriately regarded as resulting from these countries' own exchange rate action. At a more disaggregated level, however, the shift in merchandise trade deficits among industrial countries that would result from a change in the exchange rate of the U.S. dollar against other major currencies could affect the export volumes of individual developing countries. For those countries that export a large proportion of their exports to the United States, a depreciation of the dollar could be expected to reduce U.S. demand for their exports by more than the increase in demand in other industrial countries.

4.   The purchasing power of exports
      by developing countries

The combined effects of changes in the pace of growth in industrial countries on developing countries' terms of trade and export volumes determine the overall effect on the purchasing power (in terms of imports)

of their total export earnings. The results for the marginal elasticities suggest that a 1 percentage point increase in the rate of growth of real GNP in industrial countries would be associated with an increase of around 3 1/2 percent in the purchasing power of exports by non-oil developing countries (Table 12). Because of the uncertainty concerning the estimates for the terms of trade effect, this estimate is probably toward the upper end of the range of likely overall effects. Using the lower estimates of their terms of trade elasticity (of around 1/4) derived from the effects of industrial country growth on commodity prices gives an estimated elasticity of the purchasing power of exports of around 2, which may be regarded as toward the lower end of the range of likely overall effects.

Grouping countries by the category of their dominant exports, the results indicate that a cyclical increase in the rate of economic growth in industrial countries would have the largest impact on export volumes from exporters of manufactures and the largest impact on the terms of trade of primary product exporters, but that the overall impact on the pur- chasing power of exports from the two groups would be similar (Table 12). However, the group of primary product exporters includes some countries that are substantial exporters of manufactures. Results for the alter- native analytical category of "major exporters of manufactures", which includes these countries, suggests that the purchasing power of their exports would improve by more than that of primary product exporters without significant manufactured exports. The purchasing power of exports from the service and remittance countries would increase at only about half the rate recorded for the two other groups. On a regional basis, developing countries in Asia appear to record the greatest increase in the purchasing power of exports as a result of faster industrial country growth, while developing countries in Europe record the smallest increase.

However, these estimates reflect the effects of a cyclical increase in industrial country growth. The earlier discussion has suggested that the longer-term impact on developing countries' purchasing power may be lower, largely because the effect on these countries' terms of trade of an increase in the trend rate of growth in industrial countries could be substantially smaller than the effect of a cyclical increase.

5. Transmission of economic influences through
   receipts from services and private transfers

Discussions of the economic interdependence between developing and industrial countries have largely concentrated on merchandise trade flows. Nevertheless, earnings from services, migrants' remittances, and other private transfers are also quite important. During the period 1982-84, earnings from services and net receipts of private transfers amounted to almost 30 percent of total foreign exchange earnings by the group

of non-fuel exporters (Table 15). Within this group, the exporters of manufactures are the least dependent on receipts from services and private transfers--in fact, their reliance on merchandise exports has increased since the late 1960s. In contrast, merchandise exports account for a small and declining share of the total foreign exchange earnings of the service and remittance countries. Investment income earnings have increased markedly in importance for both the service and remittance countries and for the group of fuel exporters. This resulted from, respectively, the substantial accumulation of overseas assets by some oil exporting countries and the rapid expansion of the international financial services sector in a few of the service and remittance countries.

Although little information is available on the geographic destination of developing countries' service exports, a considerable share must be directed toward the industrial countries. In 1984, just under one third of total service earnings (other than from investment income) by the non-fuel exporters consisted of receipts from shipping and other transportation activities and one third were travel receipts, including those from tourism. The geographic distribution of the former category in particular was probably quite close to that of merchandise trade. Consequently, total demand for these services can be expected to be influenced by real incomes in industrial countries.

The change in the volume and price of services (other than investment income) resulting from a change in industrial country real GNP will depend on the income and price elasticities of demand for such services in industrial countries, the price elasticity of supply from the developing countries, and the price elasticity of supply from other sources, including from within the industrial countries. While it is not possible to estimate these effects directly, some information is available on the reduced-form relationship between the growth of the purchasing power of these service exports and the growth of industrial country real GNP. Econometric estimates suggest that a 1 percentage point increase in the real GNP of industrial countries is associated with an increase of around 1 1/2 percent in the purchasing power of exports of services by the non-fuel exporters (Table 16). This is substantially lower than the corresponding elasticity estimated for the purchasing power of this group's merchandise exports. As might be expected, the purchasing power of service exports from the service and remittance countries appear to be more sensitive to changes in industrial country GNP than are those of developing countries that rely mainly on merchandise trade. On a regional basis, changes in industrial country growth rates appear to have the largest impact on the purchasing power of service exports from developing countries in Europe and in the Western Hemisphere, whereas the effect on countries in Africa, Asia and the Middle East are relatively low and insignificant.

Table 15. Developing Countries: Shares of Merchandise Exports,
Services, Investment Income and Private Transfers in
Foreign Exchange Earnings, 1968-70 and 1982-84

(<u>As a percentage of total foreign exchange earnings</u>)

	Average, 1968-70				Average, 1982-84			
	Merchan- dise exports f.o.b.	Services, other than investment income	Invest- ment income	Private trans- fers 1/	Merchan- dise exports f.o.b.	Services, other than investment income	Invest- ment income	Private trans- fers 1/
Fuel Exporters	92.7	14.2	2.6	-9.5	88.6	5.9	9.3	-3.8
Non-fuel exporters	71.0	21.2	3.0	4.8	70.5	19.2	5.7	4.6
Primary product exporters	81.4	15.8	2.8	—	76.6	16.1	3.7	3.6
Exporters of manufactures	68.6	21.4	4.9	5.1	74.2	18.2	4.7	2.9
Service and remit- tance countries	48.2	32.8	5.5	13.5	32.1	34.2	22.8	14.9

1/ Net transfers.

The major component of private transfer receipts by non-fuel export-
ing developing countries consists of migrants' remittances. These coun-
tries have exported labor to the industrial countries as well as to the
major oil exporting countries. The remittances of these workers back to
the home country have been strongly influenced by the level of economic
activity in the host country. Estimates by Swamy (1981) of the elasticity
of remittance inflows with respect to various measures of cyclical eco-
nomic activity (either GDP, government expenditures, or exports) in host
countries ranged from under 1 to over 3. 1/ Rough estimates of the elas-
ticity of the purchasing power of developing countries' net private trans-
fers with respect to industrial country GNP are given in Table 16. 2/
Although none of these estimated elasticities are statistically signifi-
cant, they do suggest that, as for service receipts, it is transfers
receipts by developing countries in Europe and the Western Hemisphere
that are the most sensitive to fluctuations in economic growth in the
industrial countries. The lower sensitivity of transfer receipts by other
regional groups probably reflects their greater dependence on migrants'
remittances from oil exporting countries.

6. Effects of protectionism in the industrial countries

The stance of trade policies in the industrial countries, which can
have significant consequences for developing countries' export expansion,
is influenced by overall macroeconomic conditions in the industrial world.
Pressures to impose protectionist trade measures generally arise when
individual sectors experience a loss of comparative advantage and when
rigidities in labor and other markets hamper rapid structural adjustment.
In such circumstances, producer interests in import-sensitive sectors of
the economy often seek government action to insulate those sectors from
import competition in order to protect employment and wage levels and
profit margins. Although rising pressures for protection need not trans-
late themselves into more restrictions if governments firmly refuse to
accede to these demands, in practice governments have found it difficult
to do so during periods of stagnating or declining economic activity and
rising unemployment. Moreover, protectionist measures imposed during
periods of rising unemployment often prove difficult to dismantle quickly
when economic activity recovers. Consequently, there may be a tendency
for a ratchet effect in the degree of protectionism, as the next cyclical
downturn begins with a higher prevailing level of protectionism than did
the previous downturn.

1/ This evidence is also discussed by Goldstein and Khan (1982).
2/ Strictly speaking, this analysis should be conducted in terms of
gross transfers, but a sufficiently long time series is not available.
For most countries other than the oil exporters--which are excluded from
the analysis--outflows of private transfers appear to have been small.

Table 16. Developing Countries: Elasticities of the Purchasing
Power of Receipts from Services and Private Transfers with
Respect to Industrial Countries' Real GNP, 1968-84

	Estimated Elasticity of Purchasing Power of Exports of Services 1/	Estimated Elasticity of Purchasing Power of Private Transfers 2/
By predominant export		
Fuel exporters	1.2	...
Non-fuel exporters	1.4 3/	2.3 3/
Primary product exporters	0.6	1.0
Exporters of manufactures	1.5	3.2
Service and remittance countries	2.4*	2.7
By region		
Africa	0.7	— 4/
Asia	0.9	1.8
Europe	2.4**	3.2
Middle East	0.1	...
Western Hemisphere	2.5**	7.0
By alternative analytical category		
Non-oil developing countries	1.5*	2.6
Net oil exporters	2.8**	...
Major exporters of manufactures	1.8*	4.3
Low-income countries 5/	0.7	5.6
Other net oil importers	0.6	3.4

Note: Elasticities were estimated from ordinary least square
regressions on equations of the form:

$$\Delta \log \left(\frac{\text{exports of services}}{\text{unit value of imports}} \right) = a_0 + a_1 \, \Delta \log \text{ (industrial country GNP)}$$

and

$$\Delta \log \left(\frac{\text{net private transfer receipts}}{\text{unit value of imports}} \right) = \alpha_0 + \alpha_1 \, \Delta \log \text{ (industrial country GNP)}$$

** and * indicate significance at the 5 and 1 percent levels,
respectively.

1/ Services excludes investment income earnings.
2/ Net private transfers; consequently, equations could not be
estimated for those groups of countries that recorded a net outflow of
private transfers.
3/ Weighted average of the estimated elasticities of the sub-groups,
with 1980 service earnings or private transfers used as weights.
4/ Estimated over the period 1973-84.
5/ Excluding People's Republic of China.

Such factors underlie the increase in protectionism in most industrial countries during recent years. 1/ This protectionism has largely taken the form of nontariff restrictions. A recent study by the Organization of Economic Cooperation and Development (1985) estimates that the proportion of manufactures subject to nontariff barriers in the major industrial countries rose from 20 percent in 1980 to 30 percent in 1983. 2/ One aspect of this drift toward protectionism that is of particular concern to developing countries is the increasing recourse to bilateral, sector-specific trade restraints. Such measures are designed to restrict import competition from countries with a comparative cost advantage and are often imposed on products with relatively labor-intensive production techniques--for which developing countries are more likely to have such a comparative advantage. Nontariff barriers against the agricultural exports of developing countries are even more prevalent than those against their manufactured exports. The World Bank estimates that, in 1983, 29 percent developing countries' agricultural exports to industrial countries were affected by nontariff barriers compared with 18 percent for manufactured exports. 3/ Overall, around one-fifth of industrial country imports from developing countries were subject to nontariff barriers compared with around one-tenth of imports from within the industrial country group. 4/

Increased protectionism in industrial countries has a direct impact on developing countries' export earnings by lowering the effective demand for their exports and thereby exerting downward pressure on prices and volumes. The final impact will depend on factors such as the elasticity of foreign demand for the goods concerned (in both the industrial countries and in other markets) and on domestic supply and demand conditions in the developing countries themselves. Several studies have investigated these factors. Klein and Su (1979) use the integrated econometric country models of Project LINK to estimate the worldwide effects of tariff increases (or corresponding quantitative restrictions when import equations do not depend significantly on relative prices) on the manufactured imports of 13 OECD countries. Their results suggest that a 20 percent increase in trade barriers, introduced in 1978, would have caused a cumulative deterioration in the trade balance of developing countries of about $28 billion in the first two years and a $6 billion decline in

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1/ Recent developments in trade policies are reviewed in Anjaria et al. (1985).

2/ The proportion of manufactures subject to nontariff measures is measured by the ratio of consumption of product groups subject to such barriers to total consumption of manufactures. The proportions were calculated using 1980 values.

3/ World Bank, World Development Report, 1985, op. cit., p. 40.

4/ World Bank, World Development Report, 1985 op.cit., Table 3.3, p. 40. Such a measure tends to understate the impact of trade restrictions since the value of imports of goods that are most subject to restrictions will be correspondingly lower.

real GNP over the same period. 1/ Using partial equilibrium analysis, Kirmani et al. (1984) estimate the potential impact on the export volumes of ten developing countries of eliminating the tariff and nontariff barriers to trade in seven relatively highly-protected agricultural or manufacturing sectors of industrial countries. 2/ Their results indicate that such a trade liberalization could generate an increase in the total export volumes of the sample countries in the order of 5 to 10 percent. (They do not estimate the terms of trade effects.) Some of the largest estimated gains would result from trade liberalization in the textiles and clothing industries, where trade restraints have been directed primarily at exports from developing countries and have tended to become more extensive and more restrictive in recent years. Indeed, a more recent study by the OECD (1985) concludes that the implementation of the third Multi-Fiber Arrangement (MFA), which came into effect in 1982, reduced the volume of textile and clothing imports from non-OECD sources by around a further 10 percent in 1982 and 1983.

However, these various estimates only capture the direct impact of protectionism on developing countries' exports and economic growth. The longer-term dynamic effects, in terms of the lost opportunities for reaping economies of scale and the potential disincentives for investment in the export sectors, are likely to be even greater, albeit difficult to measure. Also, the spread of nontariff barriers, especially in the form of bilateral restrictions, reduces the price sensitivity of trade flows and can thereby increase the costs of balance of payments adjustment for developing countries. For instance, as industrial countries increase their trade barriers, the reduction in the real exchange rate required to achieve a given improvement in a developing country's trade balance is likely to rise.

In a more general equilibrium framework, changes in the stance of protectionism in the industrial countries may also affect the volume and price of capital inflows into developing countries. An increase in protectionism that hampers developing countries' export earnings may increase banks' perceived risks of lending to these countries and lead them to tighten their credit rationing. van Wijnbergen (1985) also argues that an increase in protectionism is likely to raise world interest rates. He argues that higher protectionism is likely to lead to no ex ante improvement in the current account of industrial countries but to an ex ante

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1/ This and other estimates are discussed at greater length in Anjaria et al. (1985).

2/ The importing countries are the United States, the European Community, Japan, and Canada. The seven sectors considered are meat, cereals, sugar, textiles, clothing, footwear, and iron and steel. The developing countries considered are Argentina, Brazil, India, Kenya, the Republic of Korea, Mexico, Pakistan, the Philippines, Turkey and Yugoslavia.

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deterioration in the current account of developing countries; the latter deterioration is largely due to the assumption that the demand for imported capital goods is price inelastic. These movements in the current account would imply that ex ante world investment increases relative to ex ante savings, necessitating higher real interest rates to restore the global balance. However, empirical evidence on the importance of this effect is not yet conclusive.

7. Developing countries' export growth, the
terms of trade, and real income growth

The changes in developing countries' terms of trade and export volumes discussed in the previous sections can in turn affect output growth in developing countries through four broad channels. First, the level of aggregate demand may be affected and may cause cyclical fluctuations in the degree of capacity utilization; second, changes in the ability to import scarce inputs may affect capacity utilization; third, the level of investment may be affected by changes in real incomes and savings rates or by changes in the ability to import capital equipment; and fourth, changes in the rate of growth of the export sector may induce changes in the overall rate of growth through various production linkages. The first two of these channels can be thought of as representing the short-term or 'cyclical' effects of export growth on output and the last two channels as representing the longer term, trend effects.

An assessment of the quantitative impact through these various channels is not easy. The effects will vary substantially across developing countries according to their economic structure, including the relative importance of the foreign trade sector, and will also vary over time for individual countries, according to the degree of internal and external macroeconomic balance. In particular, it should be remembered that developing countries' own policies will have a substantial influence on the degree to which their output growth is affected by changes in export earnings.

The initial impact on a country's welfare of an increase in the purchasing power of its exports is likely to differ substantially according to whether the increase is due to a terms of trade improvement or an expansion in export volumes. The former represents a clear gain in real income, since an increased volume of imports could be obtained without any change in the domestic resources allocated to producing exports, whereas an increase in export volumes will require the diversion of resources to the export sector from sectors serving domestic expenditures, unless all of the resources were previously unutilized. The welfare effect of such a resource shift will depend on the relative benefits accruing from increased foreign exchange earnings and the alternative production foregone.

In the following, a perspective is offered on the nature of these various interconnections and on the factors influencing their quantitative importance.

a. The effect on aggregate demand

Increased export earnings tend to raise aggregate demand. This can occur directly, as the increase in incomes from exports leads to a general rise in demand, and indirectly if higher exports lead to an improvement in the external position, and this encourages the adoption of more expansionary monetary and fiscal policies. The latter effect could occur if domestic financial policies reacted in response to various indicators of the external position--such as the current account or the debt and debt service ratios--which might be altered by higher exports. Conversely, developing countries may try to maintain their growth rates when export earnings fall by stimulating domestic demand and increasing their recourse to foreign borrowing. This was particularly the case in the years following the first large oil price increase, and led eventually to the need for subsequent harsher adjustment measures.

It is difficult to reach any precise a priori conclusions on the size of the overall change in aggregate demand that would result from a change in export growth. The effect would clearly tend to be larger the greater is the share of exports in a country's total aggregate demand and the smaller are the propensities to import and to save out of additional income. One important determinant of the degree to which domestic financial policies react to changes in exports will be the extent to which access to international capital flows is constrained. If a country's debt and debt service ratios are high, so that the possibilities for new external borrowing are restricted, then the initial change in aggregate demand resulting from a change in exports is more likely to be magnified by a shift in financial policies than if there is no binding constraint on new borrowing. An additional important factor is the sector to which the export gains initially accrue. This factor is of particular significance for those oil exporting countries where the bulk of receipts from oil exports accrue directly to the government, since in this case the impact on domestic aggregate demand of changes in export receipts will depend almost entirely upon how government expenditures respond to the corresponding changes in fiscal revenues.

The degree to which an increase in nominal aggregate demand is, in turn, reflected in an expansion of real output rather than in increased prices will depend in part on the prevailing level of capacity utilization, the tightness of labor markets, and the manner in which price expectations are affected by changes in demand. Domestic prices are likely to adjust more slowly to changes in nominal aggregate demand when there is substantial unutilized capacity, when labor is in excess supply, and when the change in aggregate demand is unanticipated. In such circumstances, much

of the increase in aggregate demand may be reflected in higher output. In contrast, when the degree of capacity utilization is high, labor markets are tight, and prices and wages respond rapidly to changes in aggregate demand, then the impact on real output of externally-induced changes in nominal aggregate demand will tend to be small.

Quantitative estimates of these aggregate demand effects would require the formulation of a macroeconomic model for developing countries, including a specification of how domestic financial policies would react to shifts in the external current account. Elaboration of such a model is outside the scope of this paper, but some indicative results for a group of six Asian developing countries are provided by Schadler (1986). 1/

Her results suggest that a decline of 2 percentage points in industrial country output growth (say, from a 3 percent rate of growth to a 1 percent rate) that is sustained for two years might be associated with a decline of around 2 percentage points in the annual export volume growth of the six countries and with a deterioration in the terms of trade of around 2 percent in each year. [These effects on export earnings imply elasticities with respect to industrial country GNP that are toward the lower end of the range discussed earlier.] If financial policies in these countries are moderately restrictive, this decline in export receipts is estimated to result in a reduction in the rate of growth of these countries' real GNP by almost 1 percentage point in the first year and by about 1 1/4 percentage points in the second year. 2/ A larger slowdown in real economic growth would occur if tighter financial policies were adopted to achieve an even more rapid adjustment of the current account.

b. Changes in the capacity to import

Many developing countries are heavily dependent on imports of capital and intermediate goods as inputs into production. Consequently, when the stance of exchange rate and other macroeconomic policies is such that

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1/ The six countries are India, Indonesia, Korea, Malaysia, Philippines and Thailand.

2/ In this context, moderately restrictive financial policies are defined as those necessary to achieve a reduction in the gap between the actual and a target current account deficit by one half within a year. The annual target for the current account deficit for the second year is equivalent to 2 percent of GNP, compared with an actual deficit equivalent to 2 1/2 percent of GNP in 1984, which is the base year for the simulation. However, such simulations suffer from the problem that the behavioral relationships in the model may themselves be affected by changes in policy, since the behavioral relationships depend on expected future movements in relevant variables, including those under the control of the authorities (see Lucas (1976)).

it is necessary to restrict imports either through the exchange system or the trade system, an increase in the purchasing power of exports (or in the level of capital inflows) may increase domestic output by providing foreign exchange to purchase scarce imported inputs. Moreover, the lack of foreign exchange to purchase imported capital goods may directly constrain investment, and therefore long-term growth prospects; this aspect will be considered in the next sub-section.

The strength of the link between import availability and output will depend on the severity of the foreign exchange constraint, the relative openness of the economy, the degree of substitutability between imported inputs and domestic alternatives, and the extent to which a country's policies permit shifts in relative prices to allocate available imports to the uses with the highest opportunity costs. Changes in the capacity to import will tend to have the largest impact on domestic production in the short-term, when substitution possibilities are lowest.

Empirical estimates of the elasticity of output with respect to imports are complicated by the fact that a change in output will itself cause a change in demand for imports; consequently, the direction of causation involved in any direct estimates of the relationship between changes in output and changes in imports may be ambiguous. Nevertheless, some indication of the likely range of the elasticity may be obtained from three alternative estimates.

Leven and Roberts (1983) estimate the relationship between the growth of GDP in Latin American countries during the period 1956-80 and the change in import volumes in current and previous years. Their results suggest that a 1 percentage point rise in real imports leads to an increase in real GDP of about 0.5 percent, of which about one half takes place in the same year and one half over the next five years. 1/ This estimate is likely to represent an upper bound to the actual elasticity, because of the ambiguous direction of causation already mentioned and because the contribution to output growth of other factor inputs has been ignored. Alternative estimates incorporating the contributions to output growth of fixed capital and labor are derived by Bergsten et al.

1/ Their estimated equation is of the form:

$$g_o = 5.0 + 0.24 \, g_m + 0.28 \, g_{mavg} \qquad R^2 = 0.44$$
$$ (2.46) \, (1.26) \qquad (3.46)$$

where g is growth of GDP, g_m is growth of real merchandise imports in the current year, and g_{mavg} is the average growth of imports over the past five years. Figures in brackets are t-statistics.

(1985) for selected Latin American countries. Their estimates for the period 1960-83 suggest that the elasticity of output with respect to the average of the current and previous years' real imports varies from virtually zero for Argentina, which was not subject to significant foreign exchange constraints for much of the period, to around 0.14 for Brazil, 0.23 for Mexico and 0.27 for Chile. 1/

Finally, broadly similar estimates were obtained for the Philippines by Chopra and Montiel (1986) using an entirely different approach. They incorporate a system of foreign exchange rationing of imported intermediate goods into a model in which aggregate demand policies can affect the domestic level of output only to the extent that they produce unanticipated changes in the price level, which cause the supplies of labor and domestic production to deviate from their long-term equilibrium level. In such a system, deviations in domestic output depend upon changes in the level of excess demand for imported intermediate inputs or upon unanticipated changes in either domestic money supply, foreign income or foreign prices. Their results over the period 1959-84 suggest that a 1 percentage point increase in imports will lead to a 0.28 percent cyclical increase in real output if the increase in imports is anticipated and to a 0.18 percent increase in output if the increase in import availability is unanticipated.

These various results suggest that, for countries which are subject to significant foreign exchange rationing of some form, a 1 percentage point increase in imports is associated with an increase in output in the range of 0.14 to 0.28 percentage points.

c.   Changes in export earnings and the rate of investment

Changes in export earnings can alter developing countries' long-term growth prospects by affecting the rate of fixed investment. This can occur through several channels: (i) increased foreign exchange receipts from exports (or from capital inflows) may relax foreign exchange constraints on the importation of scarce capital goods; (ii) a large share of the increased export earnings may accrue to central governments or to

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1/   These estimates are derived by estimating a production function of the form $\log Y = a_0 + a_1 \log K + a_2 \log L + a_3 \log M + a_4 t$

where Y is real GDP, K and L are fixed capital stock and the active labor force, respectively, M is the average of real imports current and lagged one year, and t is a time trend. Since the current year level of imports still enters, to some extent, into the import variable, the elasticity estimates will still tend to be biased upwards because of the simultaneity problem.

government-controlled agencies, which generally have high propensities to invest; and (iii) if the increased export earnings are due to an improvement in the terms of trade, then the resulting gain in real incomes may change the desired pattern of future consumption and hence lead to changes in the rates of saving and investment.

A scarcity of foreign exchange to purchase imported capital goods would usually have the largest impact on investment in the less industrialized developing countries. These countries generally do not have a significant domestic capital goods industry and so have fewer possibilities for substitution between domestic and foreign goods in capital formation. When such countries are faced with severe foreign exchange constraints, higher export earnings may raise the volume and the speed of implementation of investment. Marquez (1985) estimates that the long-run elasticity of investment with respect to the purchasing power of exports (in terms of imports of capital goods) is around 1 1/4 for the group of non-oil developing countries. 1/

In many developing countries (and especially the oil-exporting countries), government revenues are highly dependent on export earnings--both directly through various export taxes and other receipts and indirectly through tariffs on the additional imports that are made possible by higher export earnings. Consequently, an increase in export earnings raises government revenues, which in turn is likely to result in increased public investment. If the increase in export earnings is due to higher export volumes rather than higher prices, thereby requiring a shift of resources to the export sector from other sectors, then investment is likely to fall in those other sectors. However, this fall may not fully offset the increase in public investment especially when the effective rate of taxation of export earnings is high and a large proportion of any increase in government revenues is used to expand public investment.

Finally, it is difficult to determine on a priori grounds the size, or even the direction, of the effect that an improvement in the terms of trade has on the rate of investment, since it depends upon whether the terms of trade improvement is perceived as temporary or permanent and whether it is anticipated or not. In general, the more permanent a terms of trade improvement is considered, the more likely it is to generate a higher rate of investment, so as to make possible the desired higher consumption path. There is substantial empirical evidence that an improvement in the terms of trade strengthens a developing country's external current account, which reflects an increase in aggregate saving relative to aggregate investment. Khan and Knight (1983) estimate that, for a group of non-oil developing countries, a 1 percentage point improvement in the terms of trade leads, on average, to an improvement of over

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1/ Marquez (1985), Table 2, p. 51.

2/5 of 1 percentage point in the current account balance expressed as a ratio to exports. However, there is only limited evidence concerning how this improvement in the current account is reflected in changes in the rates of domestic savings and investment taken separately. Estimates by Fry for a group of Asian developing countries over the period 1961-83 suggest that a 10 percent permanent improvement in the terms of trade leads to an increase in investment as a ratio to GDP of about 1/2 of 1 percentage point 1/, but that a temporary improvement in the terms of trade has a relatively minor overall impact.

d. The production linkage

The transfer of factor resources from the rest of the economy to the export sector may raise a developing country's overall rate of growth because the latter sector is often the most productive and the most open to economies of scale. Faster export growth may also have beneficial effects on the non-export sectors by encouraging the intro-duction of better infrastructure and a more highly-trained labor force and by promoting the spread of improved production and management techniques.

Most of the recent empirical evidence on the quantitative importance of these links between export performance and output growth for develop-ing countries has been reviewed by Goldstein and Khan (1982). 2/ Their broad conclusions can be summarized as follows. First, cross-country studies suggest that a 1 percentage point faster growth in exports may be associated with a faster growth in real GDP of the order of 1/10 of 1 per-cent. Second, countries that export relatively more manufactured goods seem to be the ones in which the link between export performance and out-put growth is the strongest. Third, there is some indication that the relationship between export performance and output growth has grown stronger over time, probably because of the growing share of manufactures in developing country exports.

III. The Transmission of Economic Influences Through the Financial Markets

The transmission of economic influences from industrial to developing countries through the financial markets has become increasingly important both because the external indebtedness of developing countries has increased

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1/ Evaluated for a country with a ratio of exports to GNP of 0.5, and on the assumption that all other variables remain unchanged. Countries with a small ratio of exports to GNP would experience smaller increases in the investment ratio.

2/ See Goldstein and Khan (1982), pp. 24-27.

and because a greater share of capital flows to developing countries has taken the form of bank lending at variable interest rates. The principal financial linkages operate through the level of international interest rates and the exchange rates of industrial countries, which affect debt service burdens, and through the availability of private international lending. These in turn affect the levels of domestic saving and investment and the macroeconomic policies of developing countries. Although financing constraints and externally-induced changes in debt service burdens have affected almost all developing countries, the relative importance of these forces has varied widely across individual countries. Developing countries that are most heavily dependent on financing from commercial banks were the most affected by the rise in interest rates and the sharp decline in new bank lending. Accordingly, the analysis presented in this section emphasizes the capital-importing developing countries, particularly the sub-groups of market borrowers and countries with debt-servicing problems.

The analysis begins with a review of the increased international financial integration of developing countries. This provides the background for a discussion of how changes in international interest rates and in the level of financial flows to developing countries affect key macroeconomic variables in these countries, including domestic saving, investment, and economic growth. The section concludes with a discussion of the links between capital inflows, financial policies, and capital flight.

1.   Increased international financial integration of developing countries

The developing countries became much more dependent on private external financing for their economic development during the 1970s than they were before as both the public sector and private residents borrowed heavily in world capital markets. Over the eight years from the end of 1973 through the end of 1981, the total external debt of capital-importing developing countries increased at an annual rate of 21 percent. Despite the decline in capital inflows since 1982, this debt rose to $878 billion in 1985 compared with $752 billion in 1982. In real terms--deflated by the export unit value index of these countries--the external debt increased at an annual rate of 8 percent between 1973 and 1985, while export volumes rose at a rate of only 4 percent.

The most notable change in the pattern of capital inflows was a marked shift from official flows and private foreign direct investment to international bank lending. During the 1960s, the main form of international bank lending was short-term trade credit. During the 1970s, however, institutional developments in the domestic banking systems of the industrial countries lowered the risk on deposit liabilities of the money-center banks, which enabled the major banks to become the largest

recipients of international loanable funds. Furthermore, financial innovations--notably the growth of syndicated loans and the increased use of cross-default clauses, together with the greater use of variable interest rate loans--reduced perceived levels of risk in lending to developing country borrowers, resulting in a significant rise in the volume of private bank lending. 1/

From the perspective of the borrowing country, the demand for bank loans increased rapidly because of sizable payments imbalances in the 1970s, due in part to the two waves of major oil price increases. The attractiveness of such loans stemmed from their flexibility, convenience, and the low real interest rates prevailing for much of the period. The real three-month London Interbank Offered Rate (LIBOR) on U.S. dollar deposits, to which interest rates charged on many bank loans are linked, averaged only around 1/2 of 1 percent over the period 1974-78. 2/

Consequently, there was a marked shift from non-debt creating flows--official transfers and private direct investment--to debt-creating and interest-sensitive borrowing in world capital markets (Chart 3). The contribution of non-debt creating flows to the financing required for the current account deficits of capital-importing developing countries declined from 61 percent in 1970 to 28 percent in 1981, while the share of bank financing rose from 54 percent to 74 percent.

These developments greatly increased the sensitivity of developing countries to events in world financial markets. Most bank lending was at variable interest rates, and the share of capital-importing developing countries' total external debt that was subject to floating interest rates rose from an estimated 25 percent in 1973 to an estimated 52 percent in 1985. These interest payments were due irrespective of the uses to which the original borrowing had been put, whereas profit payments on foreign equity investments were more closely linked to the returns on the underlying investments. 3/ Also, new flows of bank lending to a developing country were more likely to be affected by sudden and uniform shifts in the perception of the country's creditworthiness than were other forms of capital inflows.

1/ These issues are discussed in detail by Folkerts-Landau (1985).

2/ The real interest rate is calculated as the nominal interest rate less the rate of change of the U.S. GNP deflator.

3/ This issue is examined at greater length in International Monetary Fund, Foreign Private Investment in Developing Countries (1985).

2. Interest rate and exchange rate effects

The cost of developing countries' borrowing in world capital markets is largely determined by the financial policies of the industrial countries, since there is a close relationship between domestic interest rates in industrial countries and the rate at which banks lend to developing countries. Furthermore, since a high proportion of developing country debt is denominated in U.S. dollars, an appreciation of the dollar increases the value of debt and debt service payments in terms of the currencies of other industrial countries. This section reviews some of the major influences on the level of interest rates charged on developing countries' borrowing, and discusses the impact of changes in real and nominal interest rates and of changes in the U.S. dollar exchange rate on these countries' debt service burdens.

Fiscal and monetary policies in the industrial countries influence interest rates on the world capital markets. For example, a combination of an expansionary fiscal stance and tight monetary policy causes a shift from bank deposits to government securities, which has a negative effect on bank liquidity. Since banks have balance sheet objectives, which they act to secure through asset and liability management, they respond by raising their deposit rates so as to attract the necessary deposits to fund their loan portfolio. The resulting higher cost of funds implies a general hardening of lending terms, including higher interest rates and shorter average maturities on new lending. These in turn affect the volume and cost of international finance to developing countries.

Following a period of relatively high inflation and low real interest rates in the industrial world during the 1970s, which facilitated the servicing of developing countries' external debt, these countries have faced high interest rates in the 1980s. The disinflationary policies adopted by the industrial countries have entailed historically high nominal and real international interest rates and a consequent rise in borrowing costs (Chart 4). The shift in interest rates has been especially large when compared with changes in developing countries' export prices. For example, the real interest rate for the capital-importing developing countries, measured as the LIBOR on U.S. dollar deposits minus the annual percentage change in these countries' export unit values was 18 percent in 1981-82, in sharp contrast to the negative real rate of 14 percent in 1973-77 (Table 17). Although this measure of the real interest rate declined during 1983-85, it is still very high by historical standards. Fluctuations in these interest rates were even more substantial for the subgroups of countries with debt-servicing problems and for the 15 heavily indebted developing countries.

International bank lending to developing countries is based on a formula, with the costs of funds to the borrower comprising the market interest rate--generally represented by the LIBOR or the U.S. prime rate--

CHART 3

CAPITAL IMPORTING DEVELOPING COUNTRIES
SOURCES OF EXTERNAL FINANCE, 1973-85
(In percent of exports of goods and services)

Other net borrowing[1]

Reserve related borrowing

Long-term borrowing from official creditors

Other non-debt-creating flows[2]

Direct investment
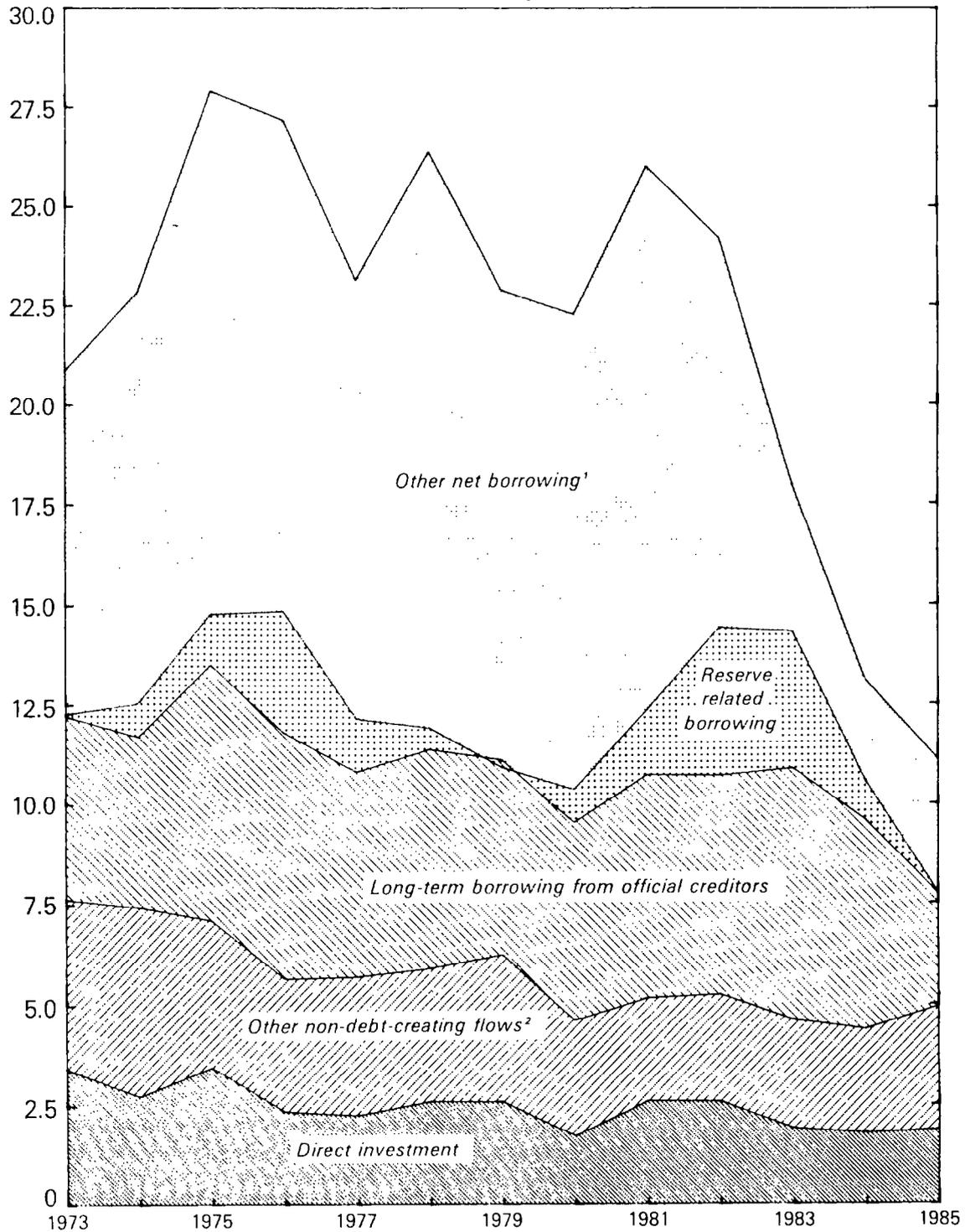
[1] Mainly from banks

[2] Official transfers, SDR allocations, valuation adjustments, and gold monetization.

CHART 4

CAPITAL IMPORTING DEVELOPING COUNTRIES
INTEREST RATES, 1963-1985
(In percent per annum)

LIBOR

Real interest rate[1]

20

10

0

-10

-20

-30

-40

-50

1963   65   67   69   71   73   75   77   79   81   83   85
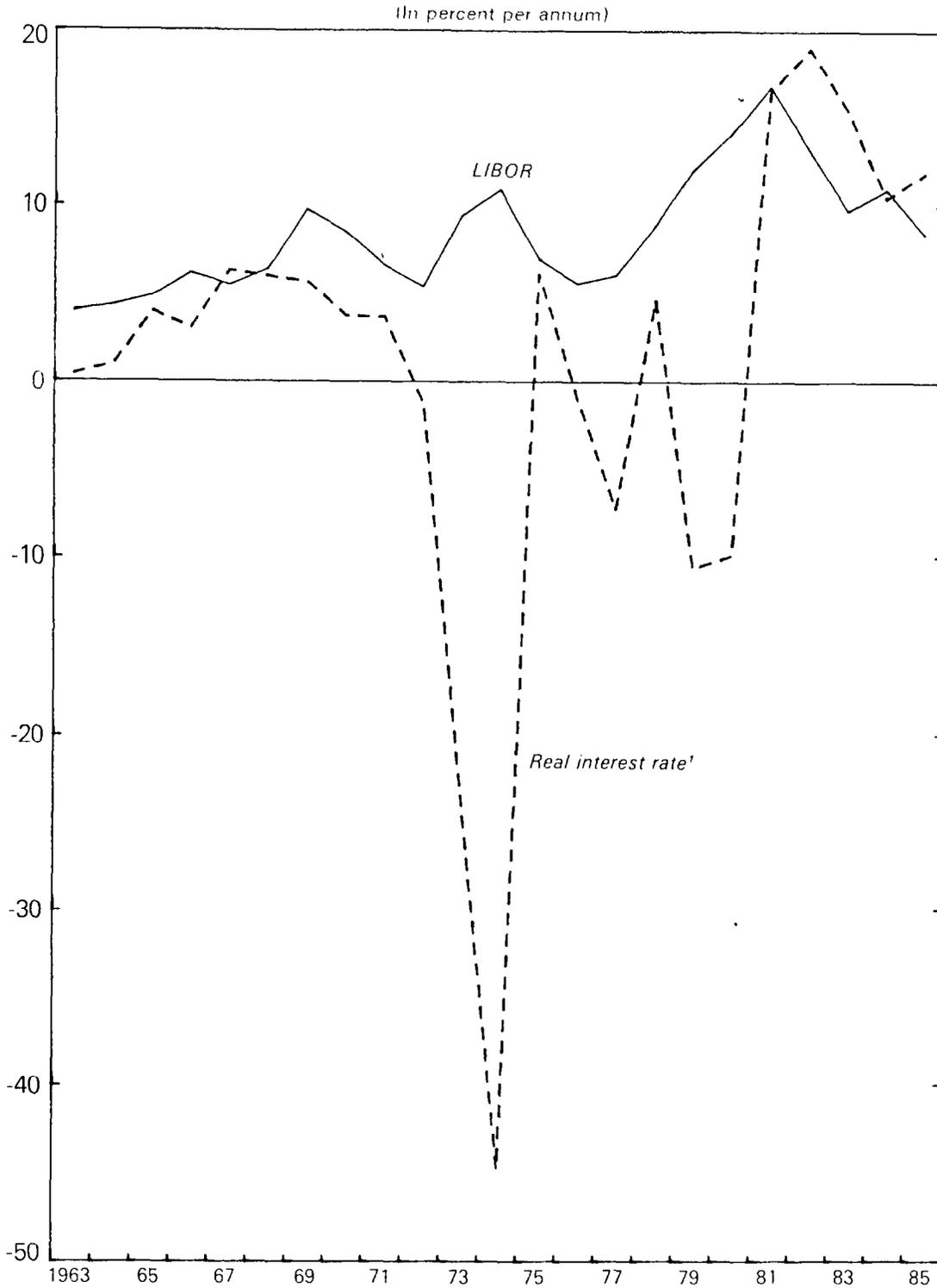
[1] The real interest rate is measured as the London interbank offer rate on three month U S dollar deposits minus annual percentage change in export unit values in dollars.

Table 17. Capital-Importing Developing Countries:
Real Interest Rates and External Borrowing 1/

(In percent unless otherwise indicated)

	1973-77	1978-80	1981-82	1983-85
Capital-importing developing countries				
Real interest rate 2/	-14.0	-5.3	17.8	12.6
Net external borrowing from private creditors 3/ (in billions of U.S. dollars)	22.6	50.7	61.6	17.2
Ratio of net external borrowing from private creditors to imports of goods and services 3/	9.2	10.6	9.4	2.8
Ratio of external debt to exports of goods and services 4/	107.9	121.0	135.7	157.6
Market borrowers				
Real interest rate 2/	-14.6	-6.8	17.6	12.7
Net external borrowing from private creditors 3/ (in billions of U.S. dollars)	18.9	43.6	62.3	11.0
Ratio of net external borrowing from private creditors to imports of goods and services 3/	11.7	13.4	13.6	2.7
Ratio of external debt to exports of goods and services 4/	98.3	113.8	132.1	151.2
Fifteen heavily indebted countries				
Real interest rate 2/	-20.3	-8.9	17.9	12.4
Net external borrowing from private creditors 3/ (in billions of U.S. dollars)	13.8	34.0	44.1	0.7
Ratio of net external borrowing from private creditors to imports of goods and services 3/	18.1	22.8	21.1	0.4
Ratio of external debt to exports of goods and services 4/	144.2	183.6	231.3	279.6
Countries without debt-servicing problems				
Real interest rate 2/	-12.3	-4.1	16.9	12.3
Net external borrowing from private creditors 3/ (in billions of U.S. dollars)	5.7	15.1	16.4	15.6
Ratio of net external borrowing from private creditors to imports of goods and services 3/	4.5	5.8	4.6	4.2
Ratio of external debt to exports of goods and services 4/	86.1	85.9	83.3	96.5
Countries with debt-servicing problems				
Real interest rate 2/	-15.9	-6.8	18.9	13.1
Net external borrowing from private creditors 3/ (in billions of U.S. dollars)	16.9	35.6	45.2	1.2
Ratio of net external borrowing from private creditors to imports of goods and services 3/	14.3	16.1	15.2	0.5
Ratio of external debt to exports of goods and services 4/	132.6	163.6	207.4	251.7

1/ For classification of countries in groups shown here, see the World Economic Outlook, Statistical Appendix.
2/ Annual average of LIBOR on U.S. dollar deposits minus annual percentage change in export unit values (in terms of U.S. dollars).
3/ Annual average. Residually calculated. Except for minor discrepancies in coverage, amounts shown reflect almost exclusively net external borrowing from private creditors.
4/ Annual averages of ratio of year-end debt to exports of goods and services. Does not include debt owed to the Fund.

plus a margin or spread. The interest rate fluctuates over the maturity of the loan, but the spread is usually fixed. These spreads over LIBOR vary according to the perceived risks associated with lending to a particular country--although generally within a relatively narrow range--and also vary substantially with the degree of liquidity in international capital markets.

The LIBOR itself can be regarded as consisting of a "risk-free" interest rate, which could be represented by the U.S. treasury bill rate and an additional margin or banking spread which reflects both the costs of bank intermediation and the risk premiums that banks have to pay in funding their own lending. This banking spread has varied considerably over time and is significantly influenced by financial developments in industrial countries. Since the probability of a developing country running into debt-service difficulties is increased with higher interest rates, the banking spread tends to rise to reflect this increased risk. This relationship between the LIBOR-treasury bill spread and the level of the treasury bill rate (T-bill rate) is shown in Chart 5. The difference between the LIBOR and treasury bill rate is plotted on the vertical axis and the level of the treasury bill rate on the horizontal axis. 1/ The positive correlation between the two is apparent from the clustering of the observations in the upper right-hand and lower left-hand quadrants. The correlation coefficient between the two series is 0.67. Dornbusch (1985) has estimated that a 4 percentage point increase in the level of the T-bill rate raises the spread between the LIBOR and T-bill rates by a full percentage point. Therefore, financial policies in industrial countries may influence the borrowing costs of developing countries not only through the level of domestic T-bill rates but also through the level of the banking spread, which tends to rise along with T-bill rates. 2/

Given the large size of the debt owed to private creditors at variable interest rates, a rise in international interest rates has a significant effect on the interest payments ratio--interest payments divided by exports of goods and services. Furthermore, the size of this effect

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1/ It should be noted that the spread being discussed (LIBOR less T-bill rate) reflects not only a loss of confidence due to increased perceptions of risks concerning commercial bank lending but also reflects competition by banks for funds as public sectors absorb a greater portion of available savings. Furthermore, the portion related to perceptions of riskiness reflects not only country risks but risks on all lending (e.g., domestic lending to the energy and agricultural sectors, etc.).

2/ In domestic financial markets, another reason for a positive correlation between the banking spread and the T-bill rate is the existence of reserve requirements, which are similar to an indirect tax on banks' interest earnings; however, there are no reserve requirements in the Eurodollar market, where the LIBOR is set.

CHART 5

CAPITAL IMPORTING DEVELOPING COUNTRIES
RELATIONSHIP BETWEEN TREASURY
BILL RATE AND BANKING SPREAD,
FIRST QUARTER 1975-THIRD QUARTER 1985

(In percent)

Mean of the banking spread

Mean of the T-bill rate

BANKING SPREAD

TREASURY BILL RATE[1]
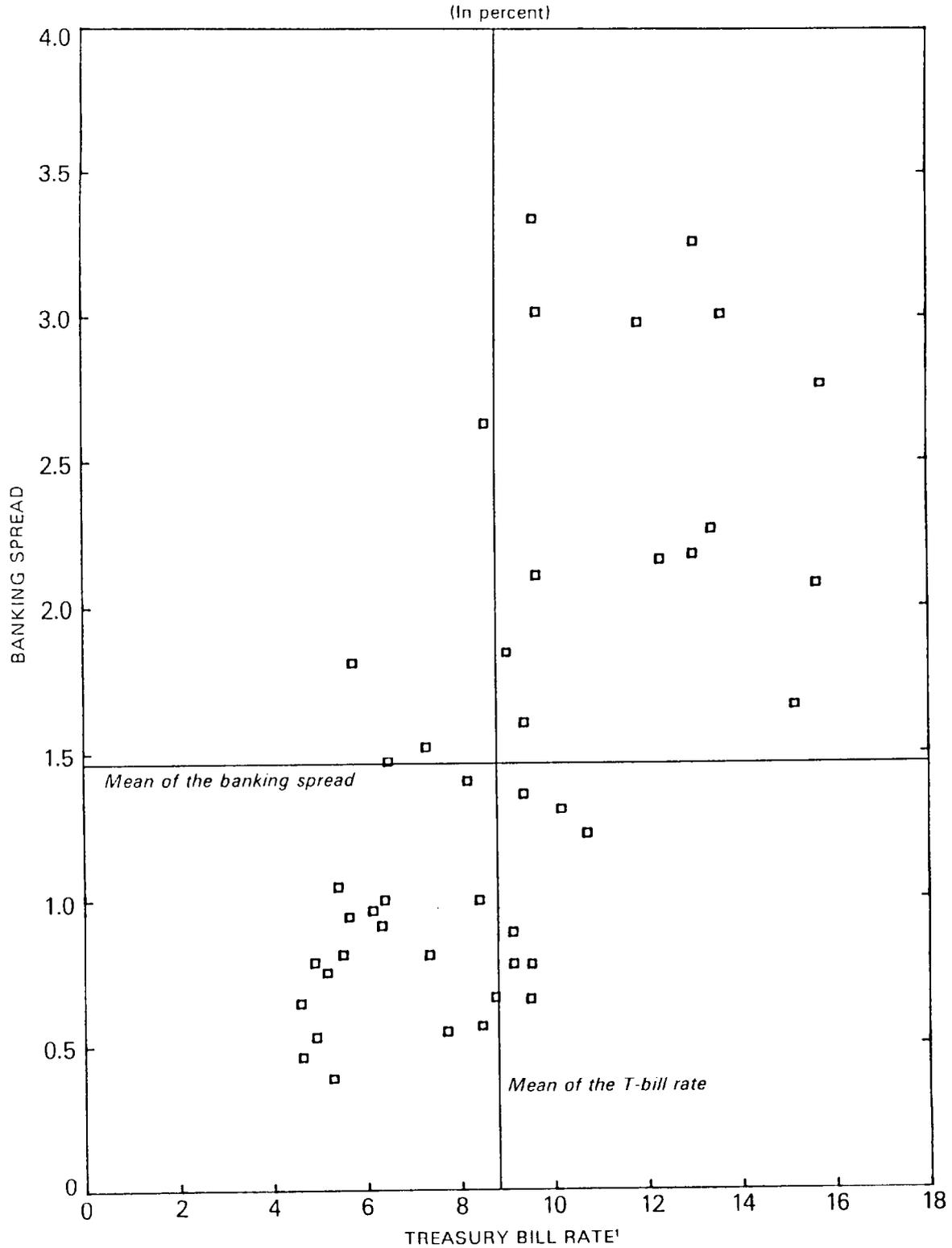
[1] Three-month bill rate.

varies considerably across the subgroups of developing countries classi-
fied by financial criteria because of considerable differences in both
the ratio of external debt to exports of goods and services and the share
of external debt owed to private creditors. For the capital importing
developing countries as a group, it is estimated that, on the basis of
1985 exports and end-1985 external debt, a 1 percentage point rise in
interest rates would directly increase the interest payments ratio by
about 1 percentage point. However, for the market borrowers and for
the 15 heavily indebted countries, the increase in this ratio would be
larger, at approximately 1 1/4 and 2 1/4 percentage points, respectively.
In contrast, the rise in the interest payments ratio for the official
borrowers (excluding China and India) would be only about 1/2 of 1 per-
centage point, reflecting the relatively small proportion of debt owed
to private creditors. The impact of the interest rate increase on the
interest payments ratio also differs sharply between the subgroups of
countries with debt-servicing problems and those without debt-servicing
problems, with increases of approximately 2 percentage points and 1/2 of
1 percentage point, respectively. In addition to the short-term, direct
effect of higher interest rates on debt service ratios, there would also
be a further, longer-term impact as debt incurred at fixed interest rates
matured, and was replaced by new borrowing at the higher rates.

Moreover, when nominal interest rates move with inflation there are
important short-run effects on developing countries' debt service burdens,
even though there is no change in the real interest rate. When nominal
interest rates rise in line with inflation because of floating rate loans,
the higher interest payments include a component to compensate the lender
for the erosion of the real value of loans. Therefore, higher inflation
rates produce larger real debt repayments in the near future and lower
real debt repayments near the end of the loan repayment schedule. In
this way, higher nominal interest rates can result in debt-servicing
problems, particularly if new lending is limited.

A depreciation of the U.S. dollar tends to reduce both the debt ser-
vice and external debt ratios of developing countries. At end-1985, approx-
imately 80 percent of the external debt of the capital importing countries
was denominated in dollars. Since this is larger than the share of U.S.
production and consumption in world markets for those goods and services
exported by developing countries, a depreciation of the dollar raises the
dollar value of developing country exports by more than the dollar value
of their external debt. For example, calculations based on the 1985 values
for exports of goods and services and external debt indicate that a 10 per-
cent depreciation of the U.S. dollar would reduce the debt ratio of the
capital importing developing countries from 162 percent to 155 percent. 1/

1/ This calculation uses the estimated impact of a dollar depreciation
on the world dollar prices of fuels, non-oil primary commodities, and
manufactures discussed in Section II.

3. The rationing of international credit to developing countries

Commercial banks make decisions not only regarding the distribution of their assets and interest rates but also about which customers to make loans to and to what extent. There has been considerable discussion in recent years about the relationship between credit rationing and default risk. Credit rationing exists when banks are unwilling to lend to a borrower even when the latter is willing to pay a higher interest rate. The availability of funds to developing countries is determined to a large extent by the judgments of commercial banks regarding the credit-worthiness of countries. The major determinants of creditworthiness include the borrowers' export performance, soundness of domestic financial policies, rate of economic growth, international reserve holdings, debt service ratio, and the existing exposure of banks. Consequently, when export earnings decline because of recession in the industrial world or when international interest rates rise, the actual and perceived capacity of developing countries to service their debt is diminished. As a result, the impact of such developments on these countries' growth prospects can be magnified by a sudden reduction in the availability of external financing.

Several explanations have been offered to explain the phenomenon of credit rationing. It has been observed that a bank's profit rate could actually decline if interest rates charged to borrowers were raised. 1/ This inverse relationship between the profitability of a loan and the interest rate charged on it could arise from the "adverse selection effects" of increasing interest rates. When interest rates are increased, the borrowers who are discouraged are likely to be those who intended to invest in relatively safe projects. The lower loan profitability might also be caused by the "incentive effects" of higher interest rates; at higher interest rates, borrowers choose riskier projects. In these circumstances, the resulting equilibrium may be one in which there is an excess demand for loanable funds at a particular interest rate, but banks do not have an incentive to raise the interest rate to eliminate the excess demand. In attempting to maximize their profits, banks ration credit to particular borrowers because the gains from higher interest rates are more than offset by the increase in the expected loss.

Credit rationing will also exist when there are doubts regarding the capacity or willingness of a borrowing country to meet its future debt service payments. 2/ Although a country that defaults on its debt incurs costs in terms of exclusion from new lending and interruption of trade flows, the threat of default may still limit the amount that any country

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1/ For instance, see Stiglitz and Weiss (1981).

2/ These issues are discussed by Eaton and Gersovitz (1981).

default--the real income advantage of not having to service the debt--
will outweigh the costs of default--the inability to secure new credit to
reduce the variability of consumption or to finance profitable investment
projects. An empirical analysis along these lines by Eaton and Gersovitz
(1981) estimated that around 80 percent of the developing countries
covered in their sample had experienced credit rationing.

Recent trends in net borrowing from private creditors by major groups
of developing countries illustrate the changing perceptions of the credit-
worthiness of developing countries and the consequent availability of funds.
The size of private foreign capital inflows expressed as a ratio to develop-
ing countries' GDP or to their imports of goods and services has varied
considerably over time and across groups (Table 18). Although these overall
trends mask some notable contrasts among individual developing countries,
several interesting observations can be made from the aggregate data. For
the capital-importing developing countries, net external borrowing from
private creditors rose from an average of 2 percent of GDP in 1973-77 to
3 percent in 1981-82 before declining to less than 1 percent in 1983-85. 1/
Expressed as a ratio of imports of goods and services, net external
borrowing from private creditors was 8 percent in 1973-77, 9 percent in
1981-82, but less than 4 percent in 1983-85. The impact of the cutback
in private capital flows on the subgroup of countries with debt-servicing
problems has been particularly striking. These countries' net external
borrowing from private creditors as a ratio to GDP averaged 4 percent in
1978-80 but declined sharply to only 1/10 of 1 percent in 1983-85. In
contrast, for countries without debt-servicing problems, this ratio
averaged only 1 1/2 percent in 1978-80 and showed a slight decrease in
1983-85.

Although capital flows to developing countries in recent years have
been dominated by movements in private sector flows, official development
assistance (ODA) and lending by official export credit agencies are also
important channels for the transmission of economic influences influences
from industrial to developing countries. In particular, ODA flows are
affected by output trends and the stance of fiscal policies in industrial
countries. Net ODA flows from Development Assistance Committee (DAC)
countries declined from a peak of around 0.52 percent of these countries'
GNP in 1960-61 to a little over 0.30 percent during 1973-74, and have since
fluctuated narrowly in the range 0.35-0.40 percent of GNP. 2/ Fluctuations
in the levels of these flows have an especially large impact on lower-income

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1/ These ratios of external capital flows to GDP should be regarded as
indicators of broad trends only, since movements in the ratios from year
to year can be significantly affected by shifts in the real exchange rate.
2/ Organization for Economic Cooperation and Development, 1985,
Table III-I, p. 93 and Chart III-4, p. 97.

Table 18. Capital-Importing Developing Countries:
Saving, Investment, and External Borrowing 1/

(In percent of gross domestic product)

	1973-77	1978-80	1981-82	1983-85
Capital-importing developing countries				
Saving 2/	25.6	24.9	23.6	24.4
Investment 3/	27.2	27.3	25.5	22.5
Current account deficit 4/	2.1	2.9	4.2	1.4
Net external borrowing from private creditors 5/	2.1	2.7	2.7	0.7
Net long-term external borrowing from official creditors 6/	1.0	1.1	1.3	1.1
Market borrowers				
Saving 2/	27.5	26.9	24.7	25.0
Investment 3/	27.0	27.3	25.7	20.7
Current account deficit 4/	2.4	3.0	5.1	0.8
Net external borrowing from private creditors 5/	3.0	4.0	4.4	0.8
Net long-term external borrowing from official creditors 6/	0.7	0.6	0.6	0.8
Fifteen heavily indebted countries				
Saving 2/	28.1	25.3	22.5	22.5
Investment 3/	26.2	25.6	23.5	17.5
Current account deficit 4/	2.1	3.6	5.4	0.6
Net external borrowing from private creditors 5/	3.2	4.7	4.8	0.1
Net long-term external borrowing from official creditors 6/	0.6	0.5	0.6	0.9
Countries without debt-servicing problems				
Saving 2/	23.9	24.6	24.0	25.0
Investment 3/	27.7	28.5	27.0	26.5
Current account deficit 4/	1.5	2.1	2.7	1.8
Net external borrowing from private creditors 5/	1.1	1.6	1.5	1.3
Net long-term external borrowing from official creditors 6/	1.0	1.0	1.2	0.9
Countries with debt-servicing problems				
Saving 2/	27.6	25.3	23.3	23.8
Investment 3/	26.7	26.1	24.0	18.3
Current account deficit 4/	2.6	3.7	5.6	1.1
Net external borrowing from private creditors 5/	3.1	3.8	3.9	0.1
Net long-term external borrowing from official creditors 6/	0.9	1.1	1.3	1.3

1/ For classification of countries in groups shown here, see the World
Economic Outlook, Statistical Appendix.
2/ Residually calculated. Gross domestic product less private and government
consumption.
3/ Gross capital formation.
4/ Including official transfers.
5/ Residually calculated. Except for minor discrepancies in coverage,
amounts shown reflect almost exclusively net external borrowing from private
creditors.
6/ Estimates of net disbursements by official creditors (other than mone-
tary institutions).

for countries with debt-servicing problems, it appears that the sharp reduction in capital inflows in recent years has been reflected primarily in a substantial reduction in investment rather than in a higher savings rate.

The relationship between the volume of financial inflows and the rates of saving and investment is examined further using the following analytical approach: each group of developing countries is divided into two equal parts for each time period considered, according to whether the level of capital inflows (expressed as a percent of imports of goods and services) over that time period was more ("above-median borrowers") or less ("below-median borrowers") than the median for the group as a whole. 1/ The median rates of savings and investment (expressed as a ratio of GDP) for these two sub-groups are then compared. 2/ The partition was conducted both in terms of the current account deficit and "other external borrowing," which is residually calculated and, except for minor discrepancies in coverage, reflects almost exclusively net external borrowing from private creditors. The current account balance is equivalent to a comprehensive measure of net financial inflows, including receipts of official grants, inflows of private direct investment, changes in official reserves, and capital outflows from private residents. But since inflows of private direct investment and official grants have not fluctuated as widely as inflows of private lending to developing countries, and to make the reporting of the results easier for the reader, only the tests conducted for "other external borrowing" are reported. 3/ The results obtained using the current account deficit were not significantly different.

The results suggest a positive relationship between the rate of external borrowing and the rate of investment (Table 19). Countries which had above-median external borrowing from private creditors (as a percentage of imports of goods and services) also tended to have higher ratios of investment to GDP. However, there were exceptions to this tendency

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1/ Similar partitions were repeated for each time period and analytical subgroup of countries examined. The partitioning of countries was not constant but was done for each period.

2/ The reason why capital inflows are expressed as a percent of imports of goods and services rather than GDP is that many capital importing developing countries have had overvalued exchange rates for considerable periods of time and often these rates have shown wide fluctuations. Since capital inflows data are available in foreign currency units and GDP data in domestic currency, changes in the real exchange rates may cause sharp changes in the ratio of these two variables. In order to limit the impact of extreme observations, the data are summarized through use of medians instead of weighted averages.

3/ In the remainder of this discussion, "other external borrowing" will be referred to as external borrowing from private creditors.

for the group of market borrowers during certain periods.   One explanation
for the investment rates not always rising with increased external bor-
rowing is inappropriate macroeconomic policies, notably with respect to
fiscal deficits, exchange rates and interest rates.   Another explanation
is the phenomenon of capital flight.

The median level of external borrowing from private creditors by the
group of capital-importing developing countries was the equivalent of
4.7 percent of imports of goods and services in 1971-75, but declined to
4.3 percent in 1975-80 and to 2.4 percent in 1983-85 (Table 19).   This
pattern was reflected in declining ratios of investment to GDP, particu-
larly for the subgroup of countries with below-median external borrowing.
The subgroup with above-median external borrowing tended to have invest-
ment rates of up to 3 percentage points more than the subgroup with
below-median external borrowing.

Countries with debt-servicing problems tended to show considerably
greater variations in their investment rates than countries without debt-
servicing problems.   In particular, for the subgroup with below-median
external borrowing among countries with debt-servicing problems, the
investment rate declined from 24.5 percent in 1975-80 to 18 percent in
1983-85.   But irrespective of whether one looks at countries with or
without debt-servicing problems, the rates of investment were consistently
higher for that half of the country group with above-median external
borrowing.

As was mentioned earlier, large outflows of capital, or "capital
flight," have caused economic difficulties for some developing countries.
In particular, capital flight has been shown in a number of studies to
have caused a build-up of the gross foreign debt, an erosion of the tax
base and, to the extent that there was a net real resource transfer from
the country, a reduction in domestic investment. 1/ Regardless of how
broadly or narrowly one defines capital flight, assessing its quantita-
tive importance is a difficult task because of the imprecision with which
financial transactions are often reported in countries' balance of pay-
ments.   Presumably, a large part of capital flight escapes recording in
the balance of payments accounts, and the measurement problems may become
more severe in countries with capital controls.   For example, when capi-
tal flight is effected through the underinvoicing of exports and the
overinvoicing of imports, the ownership of the residual foreign currency
proceeds being kept abroad cannot be observed by domestic authorities.
Despite these measurement problems, some rough estimates of capital
flight are possible by examining the errors and omissions category in

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1/   See Dooley et al. (1983), Cuddington (1985), Khan and Haque (1985),
and Williamson (1985).

Table 19. Capital-Importing Developing Countries: Gross Capital Formation
in Countries Classified by Outturns With Respect to External Borrowing 1/

	1971-75	1975-80	1978-82	1980-85	1980-82	1983-85
Capital-importing developing countries						
Median external borrowing from private creditors 2/						
(in percent of imports)	4.66	4.25	4.36	2.47	3.76	2.37
Below-median borrowers	0.06	1.51	1.36	0.25	0.20	-1.30
Above-median borrowers	9.60	10.02	7.57	7.30	8.82	5.93
Median gross capital formation (in percent of GDP)						
Below-median borrowers	22.35	25.00	24.49	22.86	22.97*	19.84
Above-median borrowers	22.39	26.02	25.76	22.85	26.12*	20.39
Market borrowers						
Median external borrowing from private creditors 2/						
(in percent of imports)	8.24	11.83	8.29	7.30	8.82	2.37
Below-median borrowers	1.41	3.10	5.50	0.69	4.47	-2.62
Above-median borrowers	13.28	17.33	18.51	10.76	16.62	6.88
Median gross capital formation (in percent of GDP)						
Below-median borrowers	26.36	27.83	30.34	25.75	29.90	21.41
Above-median borrowers	23.60	27.19	27.44	23.03	26.39	21.37
Countries with debt-servicing problems						
Median external borrowing from private creditors 2/						
(in percent of imports)	7.08	7.05	4.60	1.16	3.50	1.65
Below-median borrowers	1.72	2.86	1.24	-1.64	-1.08	-4.65
Above-median borrowers	10.80	13.10	9.59	7.05	8.35	4.46
Median gross capital formation (in percent of GDP)						
Below-median borrowers	21.52	24.51*	22.74	19.12	19.58**	17.96
Above-median borrowers	22.48	25.75*	24.90	20.67	24.70**	15.87
Countries without debt-servicing problems						
Median external borrowing from private creditors 2/						
(in percent of imports)	3.48	2.58	4.29	3.29	4.08	3.20
Below-median borrowers	-0.67	0.46	1.39	1.18	0.80	0.22
Above-median borrowers	6.93	5.23	6.89	7.34	8.99	6.45
Median gross capital formation (in percent of GDP)						
Below-median borrowers	21.66	23.54	25.86	29.76*	27.36	27.25
Above-median borrowers	23.62	26.52	26.82	24.33*	28.01	22.34

1/ The partition of capital-importing developing countries and the various sub-groups
of countries into equal numbers of below-median borrowers and above-median borrowers is
repeated for each separate time period. (See text for further explanation). Asterisks
indicate that the estimates in each pair so designated differ significantly from each
other at the 90(*), 95(**) or 99(***) percent confidence level.

2/ The estimates of external borrowing from private creditors used here are those for
"other external borrowing" and may include minor discrepancies in coverage.

the balance of payments accounts. Cuddington (1985) has argued that the errors and omissions category plus certain sub-categories of the line item "other short-term capital, other sector" may be used to estimate capital flight.

To examine the overall impact of capital flight on rates of domestic investment, the preceding analysis of the relationship between external borrowing and investment rates was repeated but with the level of external borrowing from private creditors reduced by the volume of capital flight as estimated by the errors and omissions entry in the balance of payments accounts. The results based on these adjusted figures confirm and underscore the positive relationship between external borrowing and investment rates (Table 20). Since capital flight has been substantial for certain developing countries, the median levels of net external borrowing decline by around two percentage points when adjusted for capital flight. The adjusted data indicate that countries with higher net external borrowing from private creditors also experienced higher investment rates. The data further suggest that the differences in median investment rates between the above-median and below-median groups of borrowers become more significant when capital flight is taken into consideration.

In addition to the issue of the relationship between private external borrowing and investment rates in developing countries, there is also the question of how external borrowing affects saving rates. Other things being equal, if a country borrows abroad because of a fall in saving, then the rise in indebtedness implies a fall in future consumption levels, as the debt must be serviced out of an unchanged stream of future output. However, if the external borrowing results in increased investment, then the economy is trading one asset (the debt instrument) for another (the claim to physical capital). To the extent that borrowed resources have been channeled into productive investment, such investments could be expected—given prudent management of the economy and maintenance of the competitiveness of the external sector—to generate a stream of returns to repay the associated loans. Therefore, it is of considerable interest to know how domestic savings rates were affected by the high level of external borrowing by many developing countries during the 1970s and how they responded to the decline in private lending during the early 1980s. Some evidence on these issues can be obtained by examining whether or not there have been any systematic differences in savings rates between those groups of developing countries that have and have not relied significantly on capital inflows from private creditors.

Domestic saving rates were relatively high during the period of increased external borrowing from private creditors (Table 21). When data were classified into above-median and below-median borrowers along the lines discussed above, there was a general tendency for saving rates to be higher for the above-median borrowers. For the capital importing

Table 20. Capital-Importing Developing Countries: Gross Capital Formation in Countries Classified by Outturns With Respect to External Borrowing and Capital Flight 1/

	1971-75	1975-80	1978-82	1980-85	1980-82	1983-85
Capital-importing developing countries						
Median external borrowing from private creditors minus capital flight 2/3/						
(in percent of imports)	4.23	4.02	4.06	1.90	3.27	0.87
Below-median borrowers	-0.06	-0.34	-0.39	-0.78	-0.83	-3.59
Above-median borrowers	9.20	8.63	8.22	6.00	7.85	6.22
Median gross capital formation (in percent of GDP)						
Below median borrowers	21.10*	21.85***	24.49	20.12	22.05***	19.84
Above median borrowers	23.57*	26.68***	25.76	23.16	27.01***	20.58
Market borrowers						
Median external borrowing from private creditors minus capital flight 2/3/						
(in percent of imports)	6.10	8.20	8.12	4.94	6.92	0.61
Below-median borrowers	0.89	1.84	3.57	-0.35	2.80	-5.04
Above-median borrowers	12.46	16.75	14.88	8.53	15.84	6.53
Median gross capital formation (in percent of GDP)						
Below-median borrowers	24.88	27.83	28.43	25.75	29.90	20.20*
Above-median borrowers	25.49	27.27	28.38	23.74	26.39	23.38*
Countries with debt-servicing problems						
Median external borrowing from private capital creditors minus capital flight 2/3/						
(in percent of imports)	5.85	6.29	3.53	0.20	1.61	-1.87
Below-median borrowers	0.79	0.28	-2.41	-3.71	-6.12	-5.04
Above-median borrowers	9.08	10.48	10.25	5.74	7.63	3.73
Median gross capital formation (in percent of GDP)						
Below-median borrowers	21.08	19.60**	19.21*	18.48	18.36***	15.30
Above-median borrowers	22.70	26.02**	24.97*	21.11	25.28***	17.32
Countries without debt-servicing problems						
Median external borrowing from private creditors minus capital flight 2/3/						
(in percent of imports)	1.89	3.71	4.27	3.39	4.25	2.47
Below-median borrowers	-1.41	-0.54	1.15	0.45	1.10	-1.14
Above-median borrowers	9.20	5.72	7.72	8.37	9.25	7.07
Median gross capital formation (in percent of GDP)						
Below-median borrowers	22.52	23.54*	26.40	26.97	26.09	28.60*
Above-median borrowers	23.62	27.60*	26.82	24.33	28.01	22.12*

1/ The partition of capital-importing developing countries and the various sub-groups of countries into equal numbers of below-median borrowers and above median borrowers is repeated for each separate time period. (See text for further explanation). Asterisks indicate that the estimates in each pair so designated differ significantly from each other at the 90(*), 95(**) or 99(***) percent confidence level.

2/ The estimates of external borrowing from private creditors used here are those for "other external borrowing" and may include minor discrepancies in coverage.

3/ The estimates of capital flight used here are the errors and omissions component in the balance of payments.

Table 21. Capital-Importing Developing Countries: Gross Domestic Saving in
Countries Classified by Outturns With Respect to External Borrowing 1/

	1971-75	1975-80	1978-82	1980-85	1980-82	1983-85
Capital-importing developing countries						
Median external borrowing from private creditors 2/						
(in percent of imports)	4.66	4.25	4.36	2.47	3.76	2.37
Below-median borrowers	0.06	1.51	1.36	0.25	0.20	-1.30
Above-median borrowers	9.60	10.02	7.57	7.30	8.82	5.93
Median gross domestic saving (in percent of GDP)						
Below-median borrowers	12.94*	12.86*	10.62***	13.16	11.40*	14.80
Above-median borrowers	20.36*	18.35*	19.78***	16.55	18.66*	14.93
Market borrowers						
Median external borrowing from private creditors 2/						
(in percent of imports)	8.24	11.83	8.29	7.30	8.82	2.37
Below-median borrowers	1.41	3.10	5.50	0.69	4.47	-2.62
Above-median borrowers	13.28	17.33	18.51	10.76	16.62	6.88
Median gross domestic saving (in percent of GDP)						
Below-median borrowers	25.13	27.64	29.47*	29.94**	29.95**	26.33
Above-median borrowers	26.70	25.37	22.93*	19.95**	20.14**	21.26
Countries with debt-servicing problems						
Median external borrowing from private creditors 2/						
(in percent of imports)	7.08	7.05	4.60	1.16	3.06	0.79
Below-median borrowers	1.72	2.86	1.24	-1.64	-1.08	-4.65
Above-median borrowers	10.80	13.10	9.59	7.05	8.35	4.46
Median gross domestic saving (in percent of GDP)						
Below-median borrowers	14.53	14.27*	12.53**	13.18	11.27*	13.87
Above-median borrowers	24.51	19.61*	21.22**	12.80	19.72*	12.47
Countries without debt-servicing problems						
Median external borrowing from private creditors 2/						
(in percent of imports)	3.48	2.58	4.29	3.29	4.08	3.20
Below-median borrowers	-0.67	0.46	1.39	1.18	0.80	0.22
Above-median borrowers	6.93	5.23	6.89	7.34	8.99	6.45
Median gross domestic saving (in percent of GDP)						
Below-median borrowers	13.94	12.37	11.47	12.11	13.62	15.38
Above-median borrowers	18.33	16.20	17.80	16.78	16.78	16.24

1/ The partition of capital-importing developing countries and the various sub-groups of countries into equal numbers of below-median borrowers and above median borrowers is repeated for each separate time period. (See text for further explanation). Asterisks indicate that the estimates in each pair so designated differ significantly from each other at the 90(*), 95(**) or 99(***) percent confidence level.

2/ The estimates of external borrowing from private creditors used here are those for "other external borrowing" and may include minor discrepancies in coverage.

developing countries, the subgroup of above-median borrowers had saving rates of up to 9 percentage points higher than the below-median borrowers, although this difference narrowed sharply during the period 1983-85.

Nonetheless, the market borrowers represented a notable exception to this tendency for higher external borrowing to be associated with higher domestic saving rates. For example, during the period 1980-82, the median saving rates for the below-median borrowers in this subgroup was 30 percent, while for the above-median borrowers it was only 20 percent.

The evidence presented above is, of course, suggestive rather than definitive. In the first place, individual country experiences are too heterogeneous to accord neatly with any very simple generalization. More fundamentally, it should be emphasized that even on a conceptual level, the distinction between investment and consumption expenditure is sometimes blurred. Certain components of investment, such as housing and some other types of construction, may be seen as items on which income is spent--that is, as consumer durables rather than productive investments for generating future income. Conversely, some items classified as consumer goods, such as simple tools and maintenance supplies, are similar to capital goods in their effects on increasing output and productivity. In addition to these conceptual issues, statistical problems are such that estimates of domestic savings are subject to wide margins of error in many developing countries. Therefore, analytical results based on national income accounting data, such as those presented here, need to be interpreted with due caution.

A further question concerns the efficiency of investment. High saving and investment rates by themselves do not imply immunity against difficulties in managing the external debt. A number of countries that apparently devoted the proceeds of external borrowing to investment have nevertheless encountered serious debt-servicing problems. The reasons for this are complex, and include both global economic developments-- weakness of international trade, protectionist practices in industrial countries, high international interest rates--and policies in developing countries, especially with regards to fiscal deficits, exchange rates and pricing policies, that lowered the efficiency of investment.

It is difficult to measure the efficiency of investment using macro-economic data. Perhaps the most frequently used such measure is the incremental capital-output ratio--the measure of investment per unit of additional output. However, this ratio shows wide fluctuations both across countries and over time, and these movements cannot be attributed to the efficiency of investment alone. For example, downturns in developing countries' economic activity, due in part to the 1981-82 recession and the onset of debt-servicing difficulties caused incremental capital-output ratios to rise substantially in many countries during recent years. Nonetheless, it is interesting to note that the subgroup of

countries without debt-servicing problems tend to show substantially
lower incremental capital-output ratios than the subgroup of countries
with debt-servicing problems.

The relationship between investment and output growth can also be
examined using a similar analytical approach to that used in the preced-
ing paragraphs. Each group of developing countries is divided into two
equal halves for each time period considered, according to whether their
investment as a percentage of GDP was more or less than the median for
the group as a whole.

When the data were classified into high-investment and low-invest-
ment sub-groups along these lines, then for the group of capital-import-
ing developing countries as a whole, the sub-group of countries with higher
investment rates achieved higher growth rates for each time period
examined (Table 22). The differences in the growth performances are
highly significant statistically. Similar results are obtained for the
market borrowers and for the groups of countries with and without debt-
servicing difficulties.

5. External capital flows and financial policies

The impact of developments in world financial markets on developing
countries' economic performance depends to a considerable extent on these
countries' own policy responses. Yet there may be circumstances in which
these policies are themselves constrained, to some extent, by the prevail-
ing external financial position. While a full analysis of these issues
is beyond the scope of this paper, three channels through which changes
in the external financial environment can affect domestic policies are
discussed in this sub-section: (i) changes in interest rates on external
debt and shifts in the availability of external financing can directly
affect the stance of domestic fiscal policy when a substantial proportion
of external borrowing is undertaken by the Government; (ii) a high level
of capital inflows can lead to an appreciation of the real exchange rate
and a consequent shift of resources away from the traded goods sectors,
which may be difficult to reverse quickly if capital inflows decline
sharply; (iii) developments in industrial countries can affect the level
of capital flight from developing countries, both by altering interest
rate differentials between world and domestic financial markets and by
altering domestic residents' evaluations of the risks of holding domestic
or foreign assets.

In many developing countries, government expenditures form a signifi-
cant share of total capital formation. If foreign borrowing is important
in the financing of these expenditures, then changes in international
interest rates and the level of lending by international commercial banks
will affect the conduct of fiscal policy. Furthermore, returns to govern-
ment investment, a large part of which generally consists of expenditures

Table 22. Capital-Importing Developing Countries: Growth
Performance of Countries Classified by Outturns With
Respect to Gross Capital Formation 1/

	1971-75	1975-80	1978-82	1980-85	1980-82	1983-8.
Capital-importing developing countries						
Median gross capital formation						
(in percent of GDP)	22.37	25.61	25.64	22.85	24.94	20.24
Below-median investors	17.96	19.48	18.94	17.48	18.41	14.72
Above-median investors	29.36	30.27	31.94	29.53	30.75	26.48
Growth of real GDP						
Below-median investors	4.01**	4.39**	1.42***	0.58***	1.33***	2.40**
Above-median investors	4.76**	5.51**	4.18***	3.74***	3.15***	3.34**
Market borrowers						
Median gross capital formation						
(in percent of GDP)	25.01	27.83	28.43	24.33	28.41	21.41
Below-median investors	19.58	24.29	23.33	19.40	23.69	16.23
Above-median investors	31.13	31.58	33.05	29.72	33.44	25.58
Growth of real GDP						
Below-median investors	6.06	5.48	1.42**	-0.22***	-0.22***	1.80**
Above-median investors	5.45	6.14	4.38**	4.27***	3.67***	3.88**
Countries with debt-servicing problems						
Median gross capital formation						
(in percent of GDP)	21.94	25.66	23.08	19.18	21.87	17.13
Below-median investors	17.79	18.02	17.88	15.35	17.56	13.53
Above-median investors	28.51	28.76	28.14	25.71	28.50	21.41
Growth of real GDP						
Below-median investors	3.68*	3.46*	0.55***	-0.49***	-0.91***	1.58
Above-median investors	4.06*	5.03*	3.59***	1.85***	2.75***	2.48
Countries without debt-servicing problems						
Median gross capital formation						
(in percent of GDP)	22.70	25.53	26.72	25.75	27.74	24.41
Below-median investors	18.37	20.79	22.28	20.38	21.72	18.91
Above-median investors	29.36	30.94	32.80	31.63	32.96	31.88
Growth of real GDP						
Below-median investors	4.12*	4.77**	3.28	2.36***	2.93**	3.07*
Above-median investors	6.27*	6.60**	4.81	5.04***	5.26**	4.12*

1/ The partition of capital-importing developing countries and the various sub-groups of countries into equal numbers of below-median and above-median investors is repeated for each time period. (See text for further explanation.) Asterisks indicate that the estimates in each pair so designated differ significantly from each other at the 90(*), 95 (**) or 99(***) percent confidence level.

on social overhead capital, often accrue to the private sector in the
first instance. Instead of receiving a direct return from its invest-
ment expenditures, the government relies on increases in the tax base to
meet its revenue needs for debt-servicing requirements. This difference
between the agents benefitting from the investment expenditures (the pri-
vate sector) and the agents bearing the repayment obligations (the govern-
ment) can imply that the traditional rule for optimal foreign borrowing,
according to which borrowing should be continued until the marginal rate
of return to investment equals the marginal cost of funds, is no longer
valid. Since the government taxes domestic residents to generate resources
for servicing the external debt, debt-servicing capacity in developing
countries depends not only on national income but also on the public
sector's ability to tax that income. If the fiscal system is not flexible
enough to adjust to rising debt-service ratios, sharp increases in inter-
national interest rates will have an adverse effect on the creditworthi-
ness of the country in world capital markets. In order for long-run
creditworthiness to be maintained, tax revenues must expand quickly
enough to cover the interest on external debt.

A high level of capital inflows into a developing country, which
reflects not only a strong demand for external capital but also the
absence of substantial credit-rationing constraints on its supply, will
lead to an appreciation of the real exchange rate. This will in turn
cause a shift of resources out of the sector producing traded goods. If
the level of capital inflows should then fall sharply—perhaps because
of changes in the external economic environment that cause a shift in
international commercial banks' evaluation of the risks involved in
lending to that country—the adjustment costs involved in reversing the
shift away from the traded goods sector may be high.

An insight into some of these issues can be gained from the large
literature relating to the adjustment problems of countries richly endowed
with natural resources, in which the expanding resource sector leads to a
decline in the level of economic activity in the export-oriented and
import-competing manufacturing sectors. [1] The expanding resource sector
is presumed to lead to a contraction of the manufacturing sector via the
loss of "competitiveness" due to an appreciation of the real exchange
rate. Two important effects of the expanding resource sector have been
emphasized in this literature, namely the spending effect and the resource
movement effect. The extra spending on nontraded goods resulting from
the higher incomes raises the relative price of nontraded goods and leads
to further adjustments. The resource movement effect is the drawing of
labor out of the traded goods sector into the nontraded goods sector
because the real wage rate in terms of nontraded goods declines. However,

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[1] See, for example, Corden (1981).

the wage rate measured in terms of traded goods and the real wage rate
(that is, in terms of all goods consumed) both rise because of the
resource movement effect. This increase in the cost of labor has an
adverse effect on external competitiveness. When the natural resources
are exhausted, these resource shifts will need to be reversed and the
adjustment costs involved can be substantial, especially if wage rates
and other prices are not flexible.

A similar analysis applies to economies which experience substan-
tial variations in the level of capital inflows. A high level of inflows
causes an increase in domestic expenditures relative to output. The
supply of traded goods required by the increased demand will be met by
some combination of increased imports and decreased exports, with the
resulting increase in the current account deficit being equal to the
capital inflow, other things being equal. The increased demand for non-
traded goods can only be met from domestic supply, and if supplies of
nontraded goods are unchanged, their relative price will rise. This
spending effect and the resulting resource movement effect were just
discussed. If one makes the small country assumption that the foreign
currency price of traded goods is not affected by developments in the
domestic economy, then the rise in the relative price of nontraded goods
occurs through either a rise in the domestic currency price of nontraded
goods or an appreciation of the nominal exchange rate. A sudden reduc-
tion in the level of capital inflows—either because borrowers are frozen
out of the markets by the credit-rationing phenomenon or because they
cease borrowing voluntarily in the face of high interest rates on world
financial markets—will require a fall in the real exchange rate to
restore equilibrium and may involve substantial short-run adjustment
costs, in terms of foregone output and underemployed resources, if
resources cannot be shifted quickly back to the traded goods sectors.

The foregoing discussion of the relationship between capital inflows
and exchange rates in developing countries is also relevant for the dis-
cussion of capital flight. The acquisition of foreign assets by the private
sector of developing countries can be influenced by the same factors that
influence international private lenders' judgements of a country's credit-
worthiness. Thus, a decline in industrial country demand for developing
countries' exports, or a rise in interest rates charged on external debt,
could cause domestic asset holders to anticipate future adjustment problems
and thereby lead to increased capital flight. An important observation
in this regard is that while both the public and private sectors in many
developing countries borrowed heavily in the world capital markets in the
period 1973-82, there was a general tendency for the public sector to
incur foreign liabilities that were substantially greater than their
acquisition of foreign assets, while the private sector acquired foreign
assets considerably in excess of their foreign liabilities. 1/

1/ For a detailed discussion of these issues, see Williamson (1985).

Two recent studies provide further insights into the combined effects of domestic economic policies and the external economic environment on the level of capital flight from developing countries. An empirical analysis by Cuddington (1985) suggests that inappropriate domestic policies—in particular, overvalued real exchange rates and financial policies leading to high and variable rates of inflation—are the the prime causes of capital flight. For a number of countries covered in his study, there were episodes of overly expansionary monetary and fiscal policies, which were accompanied by severe exchange rate overvaluation that contributed to large outflows of capital as expectations of an imminent devaluation became widespread. High inflation, which is typically accompanied by high variability of the inflation rate, was also a major determinant of capital flight because of the greater uncertainty it implied for the return on domestic real and financial assets. Furthermore, financial policies that kept real interest rates in the domestic economy considerably below those prevailing abroad augumented the incentive for capital flight.

Although the domestic causes of capital flight are paramount, changes in the external financial environment can also pay a role. Thus, an increase in interest rates on world financial markets will tend to widen the gap between foreign and domestic rates and—by increasing debt-servicing payments—may also increase domestic residents' evaluation of the likelihood of an exchange rate depreciation. In regard to the latter effect, results reported by Dooley (1985) suggest that capital flight in part reflects differences in the perceptions of risk faced by residents and nonresidents, and that their respective attitudes toward the risks associated with claims on a developing country are important determinants of the country's net investment income payments. The political risk premium variable, which measures the nonresidents' perception of risk in his model, seems to be an important determinant of capital flight for most of the countries considered in his analysis.

IV. Summary and Conclusions

This paper has examined the principal channels through which macro-economic developments in industrial countries—such as the rate of economic growth, inflation, and the level of interest rates and exchange rates—influence the economic growth and balance of payments of developing countries. It has analyzed the transmission of economic influences both through trade in goods and services and through financial flows. At the risk of oversimplification of the preceding analysis, the main conclusions that emerge can be summarized as follows:

(1)   Macroeconomic developments in industrial countries, especially the rate of economic growth, have an important influence on output growth in developing countries but they are not the only, or even the most important factor. The underlying structural characteristics of each country's economy and the efficacy of domestic economic policies are always major determinants of economic performance. Also, the intensity with which economic influences are transmitted from the industrial world to a particular developing country or group of countries will depend to a large extent on the degree of integration of those countries into world goods and financial markets.

(2)   Although the relative importance of the industrial countries as a group in the world market for goods has declined moderately in the last decade and a half, they are still the major market for exports and the major supplier of imports for the developing countries. They are also major competitors in the markets for most primary commodities and manufactures of importance to the developing countries.

(3)   The price of non-oil primary commodities in world trade relative to the price of manufactures ("real commodity prices") is strongly influenced by the level of economic activity in the industrial world. A "consensus" estimate might suggest that a 1 percentage point increase in the rate of economic growth in the industrial countries might be associated with a 2 percent increase in real commodity prices in the short-term, although the longer term effect would probably be lower. There is some evidence that an increase in interest rates in the industrial world might exert downward pressure on real commodity prices, but most available evidence suggests that a shift in the exchange rate of the U.S. dollar vis-à-vis the currencies of other industrial countries would not have a significant effect on real commodity prices. At a more disaggregated level, however, the relative prices of particular primary commodities and manufactures would be substantially affected by a change in the U.S. dollar exchange rate.

(4)   The commodity composition of developing countries' exports are a key determinant of the impact that industrial country growth has on their export volumes and prices. On the basis of historical evidence, the export volumes of the fuel exporters among developing countries appear to be the most sensitive to changes in the real GNP of industrial countries (with an estimated elasticity of almost 4). However, much of this sensitivity can be attributed to the attempt of the OPEC oil producers to maintain a fixed dollar price for oil by varying their production levels to match changes in demand; a change in this strategy would cause their export volumes to be less sensitive (and the world oil price more sensitive) to changes in industrial country GNP. For the group of non-fuel exporters, changes in export volumes respond to changes in industrial country real GNP with an elasticity which is probably within the range 1 3/4 to 2 1/4. Within

this group, the export volumes of those countries which are predominantly exporters of manufactures appear to be more sensitive to changes in industrial country output than do the export volumes of countries that mainly export primary products. The terms of trade of the non-fuel exporters tend to improve as the rate of economic growth in industrial countries accelerates, but there is greater uncertainty regarding the size of this effect than there is for the effect on export volumes. Alternative estimates suggest that the short-term elasticity of changes in the terms of trade with respect to changes in industrial country GNP is at least 1/4 but could be as high as around 1 1/2; longer term elasticities are likely to be toward the lower end of this range, as in the longer run supply responses become more important and inventory accumulation becomes a less important element of changes in demand. Within the group of non-fuel exporters, the terms of trade of the primary product exporters are more sensitive to changes in industrial country economic activity than are those of the exporters of manufactures.

(5) The geographic destination of developing countries' exports is an important factor in the transmission of economic influences, especially when the structure of expansion in the industrial world is unbalanced. The rapid expansion of U.S. demand for imports during 1983-84 had a much larger impact on export earnings of developing countries in the Western Hemisphere and in Asia than on the earnings of European or African countries, which were much more dependent on the European industrial country market.

(6) Protectionism in industrial countries can have a considerable effect on the price and volume of developing countries' exports by lowering effective demand for these exports. The adverse indirect effects on developing countries, such as the lost opportunities for reaping economies of scale and the disincentives for investment in the export sectors, can also be substantial.

(7) Developing countries' earnings from services and private transfers (mainly migrants' remittances) are an important source of foreign exchange earnings (accounting for around 30 percent of total earnings by the non-fuel exporters) and are also greatly influenced by macroeconomic developments in the industrial world. Econometric estimates suggest that a 1 percentage point increse in industrial country real GNP is associated with an increase of around 1 1/4 percent in the purchasing power of the exports of services (excluding investment income earnings) of the non-fuel exporters and an increase of around 2 1/4 percent in the purchasing power of these countries' net receipts of private transfers.

(8) Changes in developing countries' export earnings brought about by developments in the industrial world in turn affect their output growth. In the short-term, higher export earnings may raise aggregate

demand and the degree of capacity utilization, both directly and through
the effect of changes in the external current account on the stance of
domestic financial policies. Also, in countries which are subject to
significant foreign exchange rationing, the greater availability of
foreign exchange to purchase imported inputs can also raise output con-
siderably. Available estimates—albeit relatively crude—suggest that
in such countries a 1 percent increase in imports could raise output by
the order of 0.2 percent. In the longer term, higher growth rates of
exports can lead to higher rates of output growth both through the impact
on the rate of investment of an improved terms of trade and higher import
availability and through the technological and economic factors that tend
to cause a positive link between export promotion and overall output growth.

(9) The importance of financial markets in the transmission of
economic influences from industrial to developing countries has grown
considerably as a result of the increased levels of developing countries'
external debt and the greater role of private creditors, especially inter-
national commercial banks. The cost of developing countries' borrowing
in world capital markets is largely determined by the financial policies
of the industrial countries. Since a large proportion of capital flows
to developing countries has taken the form of bank lending at variable
interest rates, the effects of industrial country monetary and fiscal pol-
icies are quickly passed on to the developing countries through interest
rate changes. For the group of capital-importing developing countries,
it is estimated that a 1 percentage point increase in interest rates on
world financial markets would, on the basis of 1985 values for exports
and external debt, increase debt service ratios by around 1 percentage
point in the short term. The longer-term impact would be even greater,
as debt contracted at fixed interest rates matures and is rolled over at
the new rates. Also, since around four-fifths of the capital-importing
developing countries' external debt is denominated in terms of U.S. dollars,
a depreciation of the dollar tends to lower the value of their external
debt relative to the value of their export earnings.

(10) The increased importance of commercial bank lending to develop-
ing countries during the 1970s increased these countries vulnerability
to a sharp reduction in the level of capital inflows if a change in the
external enviroment or in domestic economic policies altered banks' per-
ceptions of the risk involved in lending to particular countries or groups
of countries. Such credit rationing reduces the sustainable level of the
current account deficit and makes necessary some combination of a decline
in the level of domestic investment relative to the level of domestic
savings. To the extent that the rate of investment falls, the prospects
for output growth are also likely to be lower. In this regard, the
marked slowdown in commercial bank lending to developing countries during
the last several years, especially to countries that have experienced
debt-servicing problems, appears to have been associated with a substantial
fall in overall investment rates. However, developing countries' own
economic policies, including those which influence the productiveness of
investment, are a crucial factor in determining their vulnerability to
such influences.

Table I: Developing Countries: Commodity Composition of Exports, 1965 and 1980 1/

(As a percentage of total exports)

	Food		Beverages and Tobacco		Agricultural Raw Materials		Minerals		All Non-Fuel Commodities		Fuels		Manufactures		Total	
	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980
Developing countries	17.5	7.4	8.5	2.9	11.9	4.2	8.8	4.1	46.7	18.6	20.3	46.1	33.0	35.3	100.0	100.0
Africa	18.9	9.3	12.1	5.0	14.5	4.5	16.5	10.3	62.1	29.1	0.3	12.9	37.6	58.0	100.0	100.0
Asia	21.5	11.4	7.7	1.9	23.4	9.2	9.0	4.9	61.7	27.4	0.1	8.0	37.4	64.7	100.0	100.0
Europe	14.6	10.7	5.9	1.7	7.9	4.9	3.7	3.0	32.4	20.3	---	---	67.8	79.7	100.0	100.0
Middle East	6.6	0.7	1.4	0.4	5.0	1.7	2.2	0.9	15.2	3.7	60.6	84.1	24.2	12.2	100.0	100.0
Western Hemisphere	30.1	25.1	18.3	14.8	11.6	5.1	15.3	12.7	75.2	57.7	1.8	4.3	22.9	38.0	100.0	100.0
Memorandum																
Indebted developing countries	22.5	13.7	11.3	5.2	16.0	6.6	11.4	7.2	61.3	35.7	1.0	7.5	37.7	59.7	100.0	100.0
Total world trade	12.8	8.3	2.4	1.0	7.0	3.2	5.3	3.5	27.4	16.0	5.8	14.8	66.8	69.2	100.0	100.0

Source: Derived from Bond (1986).

1/ Totals may not add because of rounding. Excludes trade by non-Fund members.

Table II. Developing Countries: Export Market Shares, 1965 and 1980 1/

(As a percentage of total world trade in each commodity group)

	Food		Beverages and Tobacco		Agricultural Raw Materials		Minerals		All Non-Fuel Commodities		Fuels		Manufactures		Total	
	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980	1965	1980
Developing countries	33.1	23.7	85.3	78.9	41.1	34.3	40.5	31.4	41.2	31.0	84.9	82.8	11.9	13.5	24.2	26.6
Africa	5.3	2.8	18.2	12.3	7.6	3.4	11.4	7.2	8.2	4.4	0.2	2.1	2.0	2.0	3.6	2.4
Asia	8.1	7.8	15.4	10.9	16.2	15.9	8.3	7.8	10.9	9.6	0.7	3.0	2.7	5.2	4.8	5.6
Europe	2.8	2.4	6.1	3.2	2.8	2.9	1.8	1.6	2.9	2.4	--	--	2.5	2.2	2.5	1.9
Middle East	4.1	1.2	4.6	5.5	5.5	7.1	3.2	3.4	4.3	3.1	82.3	76.8	2.8	2.4	7.9	13.5
Western Hemisphere	12.8	9.5	41.0	47.0	9.0	5.0	15.8	11.4	14.9	11.4	1.7	0.9	1.9	1.7	5.4	3.2
Industrial countries	66.9	76.3	14.7	21.1	58.9	65.7	59.5	68.6	58.8	69.0	15.1	17.2	88.1	86.5	75.8	73.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memorandum:																
Indebted developing countries	30.4	23.0	80.7	73.4	39.5	28.5	37.6	28.6	38.5	28.5	2.9	7.0	9.7	11.9	17.2	13.9

Source: Derived from Bond (1986)

1/ Totals may not add because of rounding. Excludes trade by non-Fund members.

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