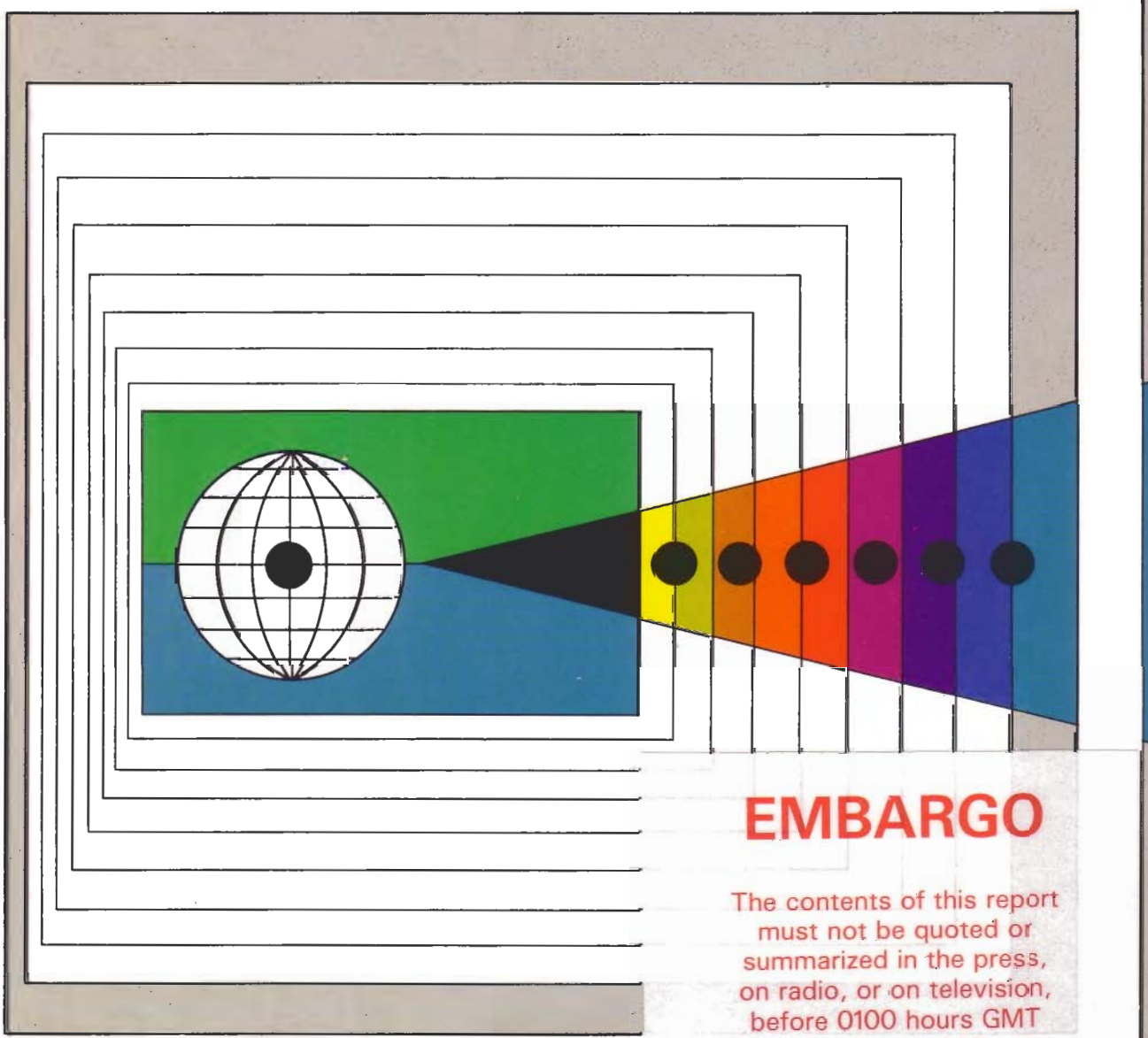
UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

TRADE AND DEVELOPMENT REPORT, 1987



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UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
Geneva

TRADE AND DEVELOPMENT REPORT 1987

Report by the secretariat
of the
United Nations Conference on Trade and Development

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Classification of countries and territories

Unless otherwise indicated, the following classification of countries and territories has been used in this Report. It has been adopted for the purposes of statistical convenience only and does not necessarily imply any judgement concerning the stage of development of a particular country or territory:

Developed market-economy countries (DMECs): Australia, Austria, Belgium, Canada, Denmark, Faeroe Islands, Finland, France, Germany, Federal Republic of, Greece, Iceland, Ireland, Israel, Italy, Japan, Liechtenstein, Luxembourg, Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States.

Socialist countries of Eastern Europe: Albania, Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania, USSR.

Socialist countries of Asia: China, Democratic People's Republic of Korea, Mongolia.

Developing countries and territories: All other countries, territories or areas not specified above.

Generally speaking, sub-groupings within geographical regions and analytical groupings (e.g. Major petroleum exporters, Major exporters of manufactures, Least developed countries (LDCs) and Remaining countries) are those used in the UNCTAD *Handbook of International Trade and Development Statistics, Supplement 1986.**

Latin America corresponds to the *Handbook* grouping "Developing America" and thus includes the Caribbean countries.

South Asia includes Afghanistan, Bangladesh, Burma, India , Nepal, Pakistan, Sri Lanka and *East Asia* includes all other countries in *South and South-East Asia* as well as countries in *Oceania*. In general, data for the People's Republic of China exclude Taiwan Province.

Commodity classification

Unless otherwise stated, the classification by commodity group used in this Report follows generally that employed in the *Handbook of International Trade and Development Statistics, Supplement 1986.*

* United Nations publication, Sales No. E.F.86.II.D.4. Since the preparation of the *Handbook*, the General Assembly has added (in its resolution 41 186 of 8 December 1986) Kiribati, Mauritania and Tuvalu to the list of least developed countries, bringing the total to 40 countries.

Other notes

In the tables and in the text: references to "countries" are to countries, territories or areas as appropriate; references to annex tables are to the tables in the statistical annex (Annex 7).

The term dollar ($) refers to United States dollars unless otherwise stated.

The term 'billion' signifies 1,000 million.

The term 'tons' refers to metric tons.

Annual rates of growth and change refer to compound rates.

Exports are valued f.o.b. and imports c.i.f., unless otherwise specified.

Use of a hyphen (-) between dates representing years, e.g. 1965-1966, signifies the full period involved, including the initial and final years.

An oblique stroke (/) between two years, e.g. 1980/81, signifies a fiscal or crop year.

One dot (.) indicates that the data are not applicable.

Two dots (..) indicate that the data are not available, or are not separately reported.

A dash (-) or a zero sign (0) indicates that the amount is nil or negligible.

A plus sign (+) before a figure indicates an increase; a minus sign (-) before a figure indicates a decrease.

Details and percentages do not necessarily add up to totals, owing to rounding.

Abbreviations

ATCP	Association of Tin Producing Countries
BIS	Bank for International Settlements
CAD	computer-aided design
CAP	Common Agricultural Policy (of EEC)
CED	consultancy, engineering and design
CEPAL	Economic Commission for Latin America and the Caribbean (Comisión Económica para América Latina y el Caribe)
c.i.f.	cost, insurance and freight
c/lb	US cents per pound
CMEA	Council for Mutual Economic Assistance
DAC	Development Assistance Committee (of OECD)
DMEC	developed market-economy country
ECAs	Export credit agencies
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
ECU	European currency unit
EEC	European Economic Community
ESCAP	Economic and Social Commission for Asia and the Pacific
FAO	Food and Agriculture Organization of the United Nations
FDI	foreign direct investment
f.o.b.	free on board
FY	fiscal year
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GNP	gross national product
GSP	generalized system of preferences
IC	Integrated circuit
ICA	International commodity agreement or arrangement
IDB	Inter-American Development Bank
ILO	International Labour Office
IMF	International Monetary Fund
INRO	International Natural Rubber Organization
IPC	Integrated Programme for Commodities
ISIC	International Standard Industrial Classification of All Economic Activities
LDC	least developed country
LIBOR	London Inter-Bank Offered Rate
mb/d	million barrels per day
MDB	multilateral development bank
MFA	Multi-Fibre Arrangement
MTNs	multilateral trade negotiations
MYRA	multi-year rescheduling agreement
NAIRU	non-accelerating inflation rate of unemployment
NMP	net material product
NTB	non-tariff barrier
NTM	non-tariff measure
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
OMA	orderly marketing arrangement
OPEC	Organization of the Petroleum Exporting Countries

R and D	research and development
SDR	special drawing right
SIGMA	System for Interlinked Global Modelling and Analysis
SITC	Standard International Trade Classification (revision 1)
SMEs	small and medium-size enterprises
TNC	transnational corporation
UNCTAD	United Nations Conference on Trade and Development
UNCTC	United Nations Centre on Transnational Corporations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
VER	voluntary export restraint
WHO	World Health Organization
WIDER	World Institute for Development Economics Research

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OVERVIEW
by the Secretary-General of UNCTAD

DEVELOPING COUNTRIES IN THE GLOBAL MACRO-ECONOMY

The world economy is now even more burdened by deflationary pressures than it was a year ago, when we identified them as the prime threat. Again, growth has slowed; investment remains depressed, in both developed and developing countries; commodity prices have declined; new lending to developing countries has contracted and debt servicing has become more onerous. And again, trade conflicts have sharpened, and uncertainties regarding key prices and the "rules of the game" have mounted. All this is compounding the maladjustments and distortions in the world economy and making structural adaptation more difficult for all. What is more, because of slow growth, technological progress is causing acute distress among commodity producers and the unemployed and souring international economic relations - instead of raising living standards and promoting international harmony. In many countries there is a growing feeling that the costs of integration into the world economy are outweighing the benefits. The problem, however, arises not from international economic integration per se, but from the way in which the various components of the world economy are deflating and distorting each other, because of inadequate management of interdependence.

As was pointed out in the previous issues of the Trade and Development Report, deflationary tendencies are not self-correcting. This view has become increasingly accepted. The major market economies have intensified their efforts at co-ordination and seem to be taking greater account of global considerations in determining their domestic policies.

But the strains in the world economy are mounting more rapidly than policies are changing. The longer Governments hesitate and the more they debate, the greater will be the eventual disruption (and the more complete will be the abandonment of today's orthodoxy). There is need not only for expansion in surplus countries, deficit reduction in the United States and greater attention to market signals, but also, and no less, for action to make the burden of developing countries' debt more tolerable, to recycle surpluses to them swiftly and on a large scale, to roll back protectionism and to give the international financial agencies a bigger role and fresh orientation. It remains to be seen whether the managers of the world economy will accept this challenge.

The sagging world economy and its outlook

The world economy's most recent performance has been dominated by steep declines in two key prices. Oil is currently at half its December 1985 value in terms of the SDR, while the dollar is at almost half its March 1985 value in terms of the yen and the deutsche mark. These price movements were widely expected to make a decisive contribution towards reviving growth, eliminating imbalances and reducing uncertainty. They have failed to do so:

- Their net impact has been contractionary: the pace of global expansion has slowed to 2.8 per cent in 1986, from 3.0 per cent in 1985;
- They have both failed so far to generate a major redistribution of market shares;
- The danger of further abrupt changes remains.

Not for the first time in this decade of deflation, developing and developed countries have been transmitting slow growth to each other. The decline in commodity prices, which is closely connected to the slow pace of expansion in the world economy, has reduced the developing countries' real income, and external constraints are making it difficult for them to revive investment and to combat inflation. The drop in exports to developing countries has been a main reason why growth in developed market economies has slowed, raising unemployment even further. Lower import costs have contributed to profits and disinflation in developed countries, but have failed to fulfil their promise of accelerating recovery.

The paucity of market outlets has not only resulted in exceptionally abrupt price movements and poor growth performance, but also has intensified international economic conflicts and domestic political pressures that would loosen linkages between national economies.

Commercial banks have all but stopped lending to developing countries, who are nevertheless continuing to pay them large sums in debt service, mostly at the expense of domestic investment. Large loan-loss provisions are not being matched by a scaling-down of any of the contractual obligations of debtors. This situation is not tenable for long. Moreover, many adjustment programmes are under severe strain, with governments experiencing increasing difficulty in securing the domestic political support necessary for their execution. Not surprisingly, the incidence of unilateral decisions on debt and adjustment has increased.

On the trade front, too, recent months have seen a significant escalation of tensions, and the number of trade disputes and "grey area" measures adopted to circumvent GATT rules has risen significantly. The underlying causes include technological change, subsidies to production, past exchange-rate misalignments, and the passing of an era in which a dominant economic power was willing by and large to accommodate other countries' export growth objectives. But the most important factor underlying recent conflicts is slow growth in global incomes and expenditures, which has sharpened the struggle for markets among firms, and brought into conflict the trade balance objectives of different countries.

The momentum of political support for protectionist action in the United States Congress is a matter of concern, as are some of the trade measures taken by the Administration to head off such action. It is difficult to see how a system based on multilateralism, the free play of market forces and agreed general rules and procedures can survive if the world's major trading nation acts bilaterally with its trading partners and outside multilaterally agreed procedures in dealing with its most urgent and important trading issues. But then, it is difficult to see how bilateralism - and, for that matter, mercantilism - can be avoided if the pace of world economic activity does not revive sufficiently to allow businesses and national economies to realize their growth potential.

The outlook will remain bleak unless a rapid evolution takes place in the policies of the major market economies regarding budget balances and the domestic money supply, and the flow of finance to and from developing countries. Output growth in both developing and developed market-economy countries will be very slow; payments imbalances will continue to be substantial; trade conflicts will sharpen; commodity prices will continue to fall; and debt servicing will become increasingly difficult (see box below). The actual outcome may well be much worse than this, because of two major downside risks:

- If the net capital flow to debtor developing countries does not rise substantially, even the minimal growth rate projected will not be achieved. Those countries may therefore fill their resource gap at the expense of debt-service payments. They avoided that option at all costs at the initial stage of the debt crisis, when prospects of their soon regaining creditworthiness and growth momentum were pictured as excellent. But they may not continue to do so if they perceive the debt strategy as unable to revive creditworthiness and growth; several heavily indebted countries at different levels of income and stages of development have already restricted debt-service payments.
- There is also a clear risk of recession. The external balance of the United States will be improving. But if the pace of improvement is so slow as to cause the exchange markets to lose patience, the United States might be obliged to raise interest rates sharply. That would inflict great damage to world economic growth, not least because prices in the leading stock markets are extraordinarily high and hence particularly vulnerable to a deceleration or decline in earnings. The impact on developing countries of a rise in interest rates and fall in the pace of global activity would be especially harsh.

Thus, financial tensions could reach the breaking point. Such an outcome would be highly disruptive, even though it would contain some positive elements. For instance, a partial restriction of interest payments would no longer have a dramatic impact on the international financial system and it could lead to an easing of monetary policy which, together with the diversion of funds from interest payments to spending on real output, could be conducive to growth. Moreover, if the United States chose not to tighten monetary policy in response to downward pressure on the dollar, policy-makers in surplus countries might feel obliged to adopt vigorous expansionary policies. The pressure on the yen has already dented the orthodoxy of the financial authorities in Japan and is rehabilitating internationally the common-sense idea that variations in fiscal stance are a useful tool for influencing aggregate demand.

But there is no need for the world economy to undergo disruption before turning to growth. The time for stimulating growth has already come:

- The scope for more expansionary macroeconomic policies in the developed market economies as a whole, led by the surplus countries, is now beyond reasonable doubt. Inflation has been surmounted, and profits and profit shares have been raised: the constraint on investment is now demand. Moreover, the need for growth in surplus countries is accepted. Japan has recently announced a big new programme of public expenditure and tax reduction; it remains for other surplus countries, in particular the Federal Republic of Germany, to follow suit, and for other countries to adjust their policies accordingly;
- Arresting the continuing slide of commodity prices is a task of the greatest urgency. The most practical means for doing so in the short term is to quicken the pace of world economic activity;
- Faster growth is also essential for stemming protectionism, which continues to rise despite the repeated declarations of Governments and their agreement to launch the Uruguay Round; it is no less essential for stabilizing the dollar;
- The cost to debtors and their trading partners of meeting debt-service obligations in full is receiving increasing recognition;.
- There is a broad consensus on the need for a substantial flow of finance from surplus countries to developing countries, both to revive the development of developing countries and to avoid a conflict among developed market-

THE OUTLOOK

The UNCTAD secretariat's forecasts for 1987, completed in end-May, assume that interest rates, the dollar and oil prices will remain at their first-quarter levels. The main features of the forecasts are as follows:

- Output growth for the world economy will weaken, and the growth of the volume of world trade will decelerate from 4 per cent in 1986 to 3 per cent.
- The terms of trade of developing countries will continue to worsen, despite the partial recovery of oil prices from their 1986 level. Dollar prices of commodities will lag behind those of manufactures, in part because the slow pace of world economic growth will depress prices of commodities, and in part because lower dollar prices of commodities are not being fully reflected in domestic selling prices in some of the major developed market economy countries, and *pro tanto* are not triggering a rise in demand. Import volume will drop further, though more slowly than in 1986, in oil-exporting developing countries; it will grow, but more slowly, in other developing countries. The current account is expected to deteriorate for Latin America and South Asia; it will improve slightly for Africa, and improve further for East Asia. Interest payments by debtor developing countries will be lower because of the assumption regarding interest rates.
- Output growth will decelerate in developing countries for a number of reasons, including: the curtailment of oil production by OPEC countries; the payments and inflationary pressures that emerged in 1986 in some of the countries with high growth rates of internal demand; the further fall in commodity prices, which will impinge in particular on growth in sub-Saharan Africa; and the slowdown of import growth in developed market economy countries. However, large low-income developing countries are expected to keep up their good performance, as is China. Prospects for growth in East Asian countries are good; but they are being clouded by uncertainties regarding how fast and in what ways they will curtail their current account surpluses.
- In developed market-economy countries, growth will decline further from the low level registered in 1986. In the United States, rising levels of indebtedness are prompting both the Government and consumers to slow or reduce their net expenditure; and, partly because of this, business investment is sluggish. The dollar depreciation is raising real net exports somewhat, but not by enough to offset the slower pace at which demand is being generated domestically. Growth is slowing in the countries with currency appreciation, largely because of the impact on investment in export production. Very slow growth is in prospect for the Federal Republic of Germany and Japan unless major domestic policy adjustments are made (no such assumptions are made in this forecast).
- In the socialist countries of Eastern Europe, growth performance is expected to weaken somewhat in 1987. The planned annual rate of growth of aggregate NMP for the coming 2-3 years, however, is set at 4 per cent. The international environment is not expected to be favourable for the region as a whole. However, there is scope for developing intra-regional trade.

economy countries over the size of their individual trade balances. This is reflected in official thinking in Japan and, even more clearly, in the Okita plan.

The remainder of this part of the Overview examines in brief various aspects of slow growth. One recurrent theme is that slow growth is obstructing adjustment in both developed and developing countries, eroding the trade and payments system, and generating uncertainty. Changes in relative prices and in the distribution of income, nationally or internationally, are no substitute for reversing global deflationary pressures through a balanced programme of global expansion that includes more generous debt relief and greater provision of new finance to developing countries.

Such a programme would not, of course, remove the need to address the longer-term structural and systemic problems of growth.* But a balanced global stimulus is a *sine qua non* for revitalizing the world economy, as well as for tackling the more fundamental questions.

Developing countries

After half a decade of coping with acute debt and payments problems, most developing countries remain unable to achieve vigorous growth and a viable external financial position. For most, the current-account balance continues to be the major obstacle to accelerated growth and the revival of development. While diversification of production and exports is necessary for relaxing this constraint, such a process is gradual and long term, and depends critically on the trade policies of industrialized countries as well as on developing countries' own efforts. Improvement in the immediate future rests on raising primary commodity prices in relation to manufactures and on increasing the net flow of finance.

For developing countries, the most notable feature of 1986 was the continued fall in primary commodity prices. Not only did oil prices collapse (see section below), but most other commodity prices also declined. In real terms, commodity prices have sunk to the levels prevailing in the Great Depression. The price declines of the 1980s have represented a sharp set-back for developing countries since more than three quarters of the developing countries are still dependent on commodities for half or more of their export earnings.

Developing countries' terms of trade declined by around 20 per cent during 1986. This was not only due to the decline in the price of oil; the terms of trade of oil importers also declined. Taken as a whole, developing countries suffered an income loss of some $80 billion as a result of the weakening of export prices vis-à-vis import prices. While this loss was heavily concentrated on a number of oil exporters, some non-oil commodity exporters also suffered substantial losses. Overall, this loss was more than enough to offset completely the 3.2 per cent rise in physical output in 1986. In other words, the real income of developing countries declined.

While interest rates fell in nominal terms and the export volume of developing countries rose, these were not sufficient to offset the deterioration in the terms of trade. Thus, import volumes rose much less than exports, and despite this both trade and current-account balances worsened.

The gain in output was unevenly distributed among countries, and can be traced mainly to the comparatively vigorous growth in some of the larger countries in Latin America and in South Asia and the exporters of manufactures in East Asia. In not all these countries, however, has the advance in 1986 been readily sustainable; for some, the gain was achieved in circumstances that cannot, or will not, be replicated in 1987. Indeed, growth in countries with a heavy debt burden has already hit the balance-of-payments constraint.

For net exporters of non-oil commodities growth in general remained poor. Variations among such countries reflect the scale and diversity of their production

* Proposals designed to deal with such matters are contained in the Report of the Secretary-General of UNCTAD to the Conference at its seventh session entitled "Reviving multilateral co-operation for growth and development" (TD/329).

and trade structures, the debt burden, developments in the markets for their specific exports and the domestic policies pursued. Many smaller non-oil commodity exporters, particularly in sub-Saharan Africa, experienced sharp declines in their terms of trade, and did not benefit greatly from lower oil prices and interest rates; oil accounts for a smaller share of these countries' imports and their debt largely carries fixed interest rates.

For several countries with a heavy debt burden, partial relief has been found in the agreed postponement of debt-service payments. Others have taken unilateral measures, limiting debt-service payments (e.g. Côte d'Ivoire, Zaire and Zambia); in some cases (e.g. Zambia) adjustment programmes agreed with IMF have also been abandoned.

A small number of commodity exporters (e.g. Kenya) enjoyed quite strong growth in output in 1986 as increases in the prices of their specific exports lifted external constraints on the economy. Some countries managed to arrest a decline in growth (e.g. Philippines) or to improve the external balance (e.g. Thailand) thanks to the stimulus to manufactured exports provided by the depreciation of their national currencies and the savings from the fall in oil prices and interest rates. Some large countries (particularly in South Asia) have been helped in sustaining growth by the scale and diversity of their productive structures and because of policies pursued to enhance self-reliance, as well as because of relatively light debt burdens.

Sharp retrenchment had to be pursued by several of the oil-exporting countries. Those which were also exporters of non-oil commodities were doubly hard hit. Some (e.g. Indonesia and Malaysia) were able to avert sharp falls in imports by increasing the volume of commodity exports and by drawing on reserves and borrowing more, which they could do because of their relatively good credit standing. In some countries (e.g. Ecuador) increases in the volumes exported offset the impact of the deterioration of the terms of trade, but in others (e.g. Nigeria) a decline in production compounded the negative impact of the fall in the price of oil. For some of the oil exporters, further deterioration of the balance of payments could only be avoided at the cost of sharply reduced domestic activity brought about by restrictive policies. In Mexico domestic product declined by 4 per cent and Ecuador had to suspend debt-service payments following the fall in oil prices and a devastating earthquake.

The major exporters of manufactures enjoyed much faster growth in 1986. The net commodity-importing countries of East Asia benefited greatly from declines in both oil and non-oil commodity prices; moreover, the debtor countries of the region also gained from the softening of nominal interest rates. Exports accounted for much of the growth and domestic demand remained sluggish. Underlying the sharp increase in these countries' exports was the continued shift, through new investment in recent years, in the sectoral composition of production towards products in greater world demand. Export growth was also helped by the effective depreciation of their currencies, which allowed them to capture a larger share of the United States market, largely at the expense of Japan. Their large and growing trade surpluses, however, have prompted strong reactions from their principal trading partner.

The major exporters of manufactures in Latin America (e.g. Argentina and Brazil) experienced substantial losses in their commodity export earnings which tended to offset the positive impact of the benefits from lower oil prices and/or interest rates. The source of growth was the expansion of domestic demand which also helped to improve the trade and growth performances of other Latin American countries. However, substantial bottlenecks emerged in some sectors, reflecting largely the sharp declines in investment during the earlier years of crisis; this led to a reswitching of goods from external to domestic markets and a reduction of trade surpluses. In Brazil the external repercussions of the expansion of domestic demand, which exceeded policymakers' original intentions, led eventually to unilateral action to limit debt-service payments.

The outlook for developing countries as a whole remains bleak. While a moderate rise in some commodity prices may occur in 1987, no clear break with the downward trend of recent years is in sight. Some commodities may benefit from substitution engendered by their lower prices, and measures taken at the international level to restrict supplies may help others. But unless the pace of world economic growth becomes much brisker the terms of trade of primary commodity exporters are expected to deteriorate further. Moreover, pressures on the dollar may force substantial increases in United States interest rates. Since - as discussed in the next section - recent trends in official and private capital flows are not going to change significantly in 1987, the increased current-account deficit of 1986, which was financed in part by drawing on reserves, is not presently sustainable.

The contraction of external lending and the debt strategy

Lending to developing countries has once again diminished, and debt servicing has become more difficult. "Debt fatigue" is spreading among all the parties involved, and is leading them willy-nilly towards adjusting the terms on old debt.

The net flow of medium and long-term private capital to developing countries appears to have declined further in 1986 in real terms. Bilateral official development assistance stagnated, as did foreign direct investment. Multilateral flows rose, but provided only modest relief. The net flow from IMF to the non-oil exporting developing countries turned into a reverse flow of some SDR 2.5 billion; the number of such countries which were net recipients of Fund credit has declined precipitously since 1983.

Although some developing countries have chosen to cut down their net borrowing as a matter of financial strategy - or even, as with the Republic of Korea, begun retiring some of their debt - for most, the contraction of borrowing has been involuntary. Many of these countries continue to face a huge negative net transfer of financial resources. For Latin America, the net outflow amounted to around $22 billion in 1986 - nearly a quarter of export earnings. Contrary to reasonable economic expectations and to historical experience, countries in the process of development are transferring real resources to the more mature economies, and for some this anomaly has persisted for a number of years.

For the great majority of developing countries, the continued low level of bank lending is a reflection less of inadequate policy efforts on their part than of the interaction between the large overhang of debt and the persistent worsening of the terms of trade. The fall in export prices has been so sharp that ratios of total outstanding debt to exports - the most widely-used measure of the degree of indebtedness - have risen despite sizable increases in export volumes; their average level in 1986 was more than 70 per cent higher than in 1981 for a group of highly indebted countries, and more than 90 per cent higher for low-income countries. Ratios of debt service to exports have changed little, and declines in nominal interest rates have not been accompanied by corresponding movements of real interest rates.

The debt strategy pursued since 1982 has thus failed to revive lending from the capital markets and to correct the problem of over-indebtedness. Indeed, the hope that countries heavily indebted to private capital markets can be restored to

creditworthiness in the foreseeable future now seems further than ever from being fulfilled.

Meanwhile, fears about the effects of the indefinite postponement of interest and amortization payments on banks' earnings and assets have diminished as banks have reduced the weight of the heavily indebted countries in their total loan portfolios and in relation to their capital base. The debts of many developing countries have been traded in secondary markets at significant discounts for some time, which means that market forces are signalling the lack of credibility of the assumption of the present debt strategy that debt will eventually be paid in full. The use of debt-equity swaps has spread, but the technique cannot be expected to make more than small inroads into the total amount of outstanding debt.

Moreover, banks have been making increased provision against possible future losses. In Japan 25 banks have set up a new company to which they have sold some of their troubled developing country debt at a discount. In North America and the United Kingdom, some of the largest banks and biggest creditors of developing countries have made sizable loan-loss provisions. Creditors are thus adjusting to the prospect that developing countries will not return to full servicing of their debts in the foreseeable future: their reluctance to lend is the mirror-image of this perception. Nevertheless, banks are continuing to require debtors to service their debts in full.

But "debt fatigue" is not confined to creditors. It seems likely that troubled debtors will, sooner or later, insist that if their creditors are preparing themselves to take losses, and actually taking losses, by selling their loans at a discount, debtors should benefit accordingly - especially if the creditors are as a result going to be even more unwilling to provide new lending. Brazil, Côte d'Ivoire and Zambia have joined the countries limiting interest payments to banks, some of which (such as Peru) have formally announced limitations and some of which are applying limitations in practice.

A process of action and reaction by individual creditors and debtors is likely to be disorderly. It would lead to inherently conflictual and unstable relationships, involving many different parties, each lacking an overall perspective and uncertain of the ultimate outcome. It would, moreover, ultimately put an end to such involuntary lending as remains.

For capital-value adjustments to be orderly, a measure of debt or debt-service forgiveness must be made part of the normal 'menu' of financial techniques. This will need intergovernmental oversight designed to ensure an adequate response to the need for reviving growth in troubled debtor countries. In short, private creditors and creditor governments will need to acknowledge that the problem is no longer one of cash flow, and to modify the rule that debtors must invariably meet their interest bill in full.

The Venice Summit agreed that "for those of the poorest countries that are undertaking adjustment effort, consideration should be given to the possibility of applying lower interest rates to their existing debt, and agreement should be reached, especially in the Paris Club, on longer repayment and grace periods to ease the debt service burden." The principle underlying this position could be made more general in the form of an agreement that, in all countries where export prospects are such that excessive indebtedness cannot be reduced through domestic policy changes without unacceptable economic, social and political consequences, lowering the interest cost (or cancelling part) of the existing debt - whether to official or private creditors - is preferable to accumulating further debt. A consensus along these lines could pave the way towards reviving growth, and normalizing creditor-debtor relations and the direction of net resource flows, for a wider range of countries than is currently under consideration. Such a principle is compatible with the case-by-case approach.

For most developing countries, the multilateral agencies have become their one significant source of new external funds. The World Bank, in particular, has been accorded a central role in lending to assist countries meet the two objectives

of structural adjustment and growth. If new disbursements from IMF the and World Bank are to rise as they should, they must ensure that their conditionality is sufficiently flexible. It will also be necessary to put larger resources at the disposal of these agencies. This should be helped, in a modest way, by the eighth replenishment of IDA. The main need on the resource side now is an increase in the Bank's capital base and hence borrowing capacity.

For the poorest countries, primarily in sub-Saharan Africa, there remains a sizable resource gap. It is widely recognized that without new aid and debt relief, those countries' attempts to help themselves will fail. The Venice communiqué, besides containing the positive language on debt relief cited above, welcomed "the various proposals made in this area by some of us and also the proposal by the Managing Director of the IMF for a significant increase in the resources of the Structural Adjustment Facility over the three years from January 1, 1988" and urged "a conclusion on discussions on these proposals within this year".

Prospects for additional capital flows to developing countries also depend on the extent to which official support is given for recycling current-account surpluses. This is discussed below, in connection with Japan.

Domestic savings and investment

Most developing countries are caught in a vicious circle, with the very factors that have pushed down investment making it hard for them to raise savings. The needed recovery of savings and investment is dependent both on an improvement in the external environment and on the pursuit of appropriate domestic policies.

While there can be little doubt that increased efforts are needed to mobilize domestic resources for growth in developing countries, there are several constraints on the scope and effectiveness of the measures usually recommended to boost savings and investment, such as raising real rates of interest.

- Resumption of growth is itself necessary for increasing domestic savings; it is not easy to reverse the causality between income and savings, particularly where per capita incomes and consumption have already fallen to levels that endanger social peace;
- Financial stability, which is essential to improve the volume and allocation of savings, is difficult to attain when the external balance remains seriously disrupted. The decline of oil and other commodity prices (which has made a major contribution towards bringing down inflation in developed market economies) has, together with high international interest rates and cuts in lending, accentuated inflation in developing countries by necessitating sharp cuts in imports, domestic production and absorption;
- In most developing countries the financial system is extremely fragile, being characterized by predominance of short-term over investment finance; a strong preference for highly liquid assets; underdeveloped capital markets; and an excessive reliance by firms on debt rather than equity. When interest rates are raised or the financial system is deregulated, these structural deficiencies, together with inflationary pressures, often tend to affect adversely the volume and allocation of existing savings.

In many developing countries high interest rates have failed to raise the propensity to save significantly. Instead, they have served to redirect existing savings into financial assets, often at the expense of housing investment and of

non-corporate and corporate borrowers in informal credit markets that lack access to bank credits. They have also redistributed income from the corporate sector and the government to rentiers, which does not always raise savings.

Since businesses in developing countries are much more reliant on borrowed funds (as opposed to equity), sharp increases in the cost of bank loans have generally reduced the retained profits and borrowing power of firms, thereby damaging the capacity of the corporate sector to invest. The profit squeeze has been especially tight when, at the same time, demand management has been restrictive. Many firms have been pushed into "distress borrowing", and/or into bankruptcy. In some cases, this has been sufficiently widespread to force the government to divert its limited financial resources into rescuing financial institutions.

Higher domestic interest rates have added to other sources of budgetary pressure by raising the cost of servicing government debt. The huge fiscal consolidation required of most developing countries, and the tight ceilings on domestic credit expansion typical of IMF stabilization programmes, have frequently led governments to make deep cuts in public investment, including on health and education, and in subsidies on production inputs.

Financial deregulation has often proved disruptive, particularly when external capital transactions have been included. It has typically caused real interest rates to escalate to extremely high levels; diverted savings into short-term speculation at the expense of long-term investment; and contributed to large-scale capital flight. Widespread bankruptcy of financial and non-financial corporations has often ensued, followed by large-scale rescue operations. This has led in some cases to *de facto* public ownership of the banking system; reimposition of controls on interest rates and financial operations; subsidization of external debt servicing; nationalization of private external debt; and introduction of complete control over foreign borrowing.

In many developing countries, a more efficient allocation and use of existing resources can help to relax the existing balance-of-payments constraint. There is, in particular, scope for increasing the availability and reducing the cost of credit to sectors of key importance for restructuring the economy, in particular those producing exports and import substitutes. Moreover, increased efforts are often necessary to raise the real rate of return to savers by lowering the rate of inflation. Over the longer term, the efficiency of the financial system needs to be substantially enhanced, by means of structural policies designed to improve corporate finance, to increase the role of long-term securities, and to enhance the efficiency of the banking system.

Oil prices

Oil prices have firmed in recent months, but are still shaky because of the revenue pressures on exporting countries. Faster growth in the world economy would foster oil-price stability, and this, in turn, would promote sustained global expansion.

Oil prices plummeted from an average of around $28 per barrel at the end of 1985 to less than $10 per barrel in mid-1986. At the end of the summer they began to firm, reaching on average $12-15 at the end of the year and $18 in the early part of 1987.

The price collapse was triggered by OPEC's shifting its strategy towards increasing its market share. It was expected that competition from OPEC members would induce those non-OPEC producers that had not been doing so, in particular those of the North Sea, to co-operate with OPEC by making voluntary production cuts, thereby allowing production programming to be re-established; or alternatively, cause the shutting-down of high-cost production and curtailment of new exploration and development, and stimulate an increase in the demand for oil via reverse substitution and accelerated growth in oil importing countries.

However, in practice neither of these expectations was realized. The United Kingdom proved unwilling to make production cuts. It was found that because marginal variable costs tend to be low even for producers with high average costs, relatively little non-OPEC production was vulnerable in the short term to a moderate fall in prices (although investment in the oil industry slumped by 30 per cent worldwide, and 40 per cent in the United States). Moreover, oil demand proved to be inelastic, and, as discussed below, far from inducing GDP growth in oil-importing countries to accelerate, the price fall caused it to decelerate.

It thus became increasingly evident that the eventual benefits of the market-share strategy would accrue only after many more years, and involve much greater revenue sacrifices than had been expected. This was true even for those OPEC members which had previously taken the brunt of production cuts and were therefore best placed to step up their output levels, such as Kuwait and Saudi Arabia.

The price collapse caused acute problems for many OPEC members, including some in the Persian Gulf; other developing country producers; oil producing regions (such as Texas) in industrialized countries; oil and oil-related companies; and financial institutions heavily exposed to energy-producing countries, regions and companies. Moreover, consideration began to be given in the United States Congress to an oil import tax.

This configuration of forces prompted OPEC to seek to put an end to the intense price-competition prevailing among producers. Production quotas were re-established, and it was understood that Saudi Arabia would no longer bear a disproportionate share of the "swing producer" burden. The market price eventually settled in the range of $18.

However, a number of basic issues remain unresolved:

- If growth of the world economy remains sluggish, OPEC markets will continue to be weak. The fact that prices are lower than before the price collapse will eventually help to increase the demand for OPEC oil, but how far and how fast is none too clear. Demand for OPEC oil was strengthened by the severe European winter, but there is still a stock overhang;
- The extent to which non-OPEC producers will co-operate in adjusting supply to demand is also difficult to predict;
- The determination of OPEC members to abide by the quotas that have been set will continue to be tested by the intense financial pressures on most of them (including those stemming from military expenditures and/or debt service);
- It remains to be seen how the swing producer burden will be shared. The present system of setting *both* official selling prices for certain crudes *and* production ceilings for individual countries unwittingly tends to assign that role to one or two countries;
- OPEC continues to lack a long-term price strategy.

It is therefore too early to conclude that a regime of stable and predictable prices is now in place.

Even if a more efficient system of distributing the swing producer role were devised - for example, by allowing prices to fluctuate within a range, while adjusting production quotas periodically to achieve a target price - the financial pressures on OPEC countries would be strong, particularly if the world economy

expanded slowly. One possible response to mounting pressures may be another price collapse; however, by checking new investment, exploration and development, this could lead to shortages and soaring prices a few years later. Alternatively, OPEC might opt for enlarging its current revenues by raising prices and cutting production further - which might in turn trigger another price collapse later on. In either case, prices would continue to be volatile, with disruptive effects of various kinds for producers, consumers and the world economy in general.

On the other hand, there is little reason to think that an acceleration of world economic growth by one or two percentage points would cause prices to rise sharply. For one thing, there is a very large margin of spare capacity in oil-producing countries. For another, these countries have a heavy pent-up demand for imports and financial assets, and, in some cases, considerable debt.

In short, the prospects of attaining stability in the price of oil would be significantly enhanced by more rapid world growth. Equally, the prospects of sustained world economic growth would be enhanced by oil-price stability. Breaking out of the present vicious circle of instability and deflation is one of the important challenges before the international community.

The slow-down in developed market economies

The fall in oil prices was expected to have an expansionary impact on the developed market economies. In practice, it caused them to slow down. The main reason was that domestic demand was not stimulated sufficiently to offset the strongly depressive influence of the cut-back in imports by oil-exporting countries.

Although for Canada, Norway and the United Kingdom it brought losses, for developed market-economy countries taken together the drop in oil prices brought a gain of 0.7 per cent of GDP, or $60 billion. The terms-of-trade gain amounted to as much as 1.7 per cent of GDP for Italy, 1.4 per cent for the Federal Republic of Germany, 1.2 per cent for France, 1.1 per cent for Japan, and 0.5 per cent for the United States.

However, the overall gain was not translated into a higher overall level of spending:

- Some of the gain, particularly in Italy, and in Denmark, Greece, Ireland, Portugal and Spain, was captured by governments, and was largely used for fiscal consolidation;
- A substantial portion of the benefit accruing to the private sector was absorbed by business profits rather than passed on to the final consumer, particularly in Japan. These gains were mainly used to improve balance sheets rather than step up investments, largely because firms felt able to satisfy existing and expected demand without adding to capacity;
- Much of the gain, especially in Western Europe, accruing to households in the form of lower prices for petrol and other fuels was initially saved; consumers increased their expenditures only in part and with a time-lag.

By contrast, the losers from the oil-price fall reduced their spending greatly and swiftly:

- The volume of exports from OECD countries to developing countries has been declining (except for a pause in 1984) since the onset of the debt crisis in the early 1980s. In 1986, largely due to the fall in oil incomes, the rate of

decline rose to about 10 per cent - more than three times the average pace in 1982-1985. This was a major factor behind the slow-down of developed market economies in 1986. The loss of export markets in developing countries cost OECD countries at least half a percentage point of GNP. The import cuts made in response to falling oil prices proved to be much more pronounced than the increases in the early 1970s because of the rise in the number of developing countries exporting oil and (connected to that), the deterioration in the financial positions of the so-called "low absorbers";

- Oil-producing regions within the OECD area curtailed their expenditures swiftly and sharply, and world investment in energy was, as already noted, drastically cut.

The deflationary impact from these sources initially overwhelmed the expansionary impulses referred to earlier; and the second-round effects of the deflationary impact that came into play offset the delayed upward response of households.

Had macroeconomic policies been more supportive of growth, domestic demand would have grown sufficiently to offset the contractionary effects. However, the fiscal stance remained neutral; although monetary policy was relaxed, this was done very cautiously and long-term real interest rates remained high.

Consequently, GDP growth fell to 2.4 per cent - even lower than in the previous two years. The main prop to demand was consumer spending, as it had been in the previous three years. In Western Europe, consumer spending rose in response to lower import prices, but in the United States, where the growth of consumer spending had reflected primarily increased borrowing and reduced saving by households, such spending decelerated. In Europe, investment in consumer goods industries generally responded positively to the demand impulse. Overall, however, aggregate investment continued to stall because of the weakness of demand, and made an even smaller contribution to growth than in previous years.

The weakening of growth in 1986 and, more particularly, its further weakening in the first half of 1987, also reflected the asymmetrical impact of dollar depreciation. This is discussed in the next section.

The United States dollar and trade deficit

The dollar has again been falling steeply against other major currencies. It is now being supported by massive dollar purchases by the central banks of surplus countries. Neither artificial financing of this kind nor deflationary adjustment by the United States can provide a viable solution. What is required is vigorous expansion in the rest of the world, together with increased financing for the developing countries.

The depreciation of the dollar began with the bursting of a speculative 'bubble' which had driven it to an inflated level, and was reinforced as the focus of attention of currency markets shifted away from interest rate differentials, which had narrowed considerably, towards the rapidly growing external deficit. This shift was encouraged by the active concern of the United States authorities to stem the leakage of demand abroad and thereby counteract growing protectionist pressures, and to curb the budget deficit. With fiscal stimulus no longer being applied by the United States, the additional demand for output needed by businesses to revive and sustain growth had to be found in an improvement in the trade balance. The potential danger that dollar depreciation

would stoke up inflation had largely subsided because of the considerable slack present in the economy and the lessening of cost pressures already achieved; the collapse of oil prices lessened it further. It was understood by the authorities - and also by a growing body of academic opinion - that an attempt to curtail the trade deficit primarily by tightening fiscal policy could trigger another recession, which would put further pressure on indebted countries and industries, and that the resulting unemployment might accentuate protectionist pressures (even if reduced government borrowing succeeded in lowering interest rates and hence the dollar).

The $100 billion worsening of the United States trade balance in 1982-1985, which had turned that country into a net debtor, reflected a mushrooming of import volume, stagnation of export volume, and sharp fall in revenues from commodity export. While the narrowing of the technological gap between the United States and other countries and the agricultural policies pursued abroad had been partly responsible, three inter-related macroeconomic factors played the dominant role: (a) the upward movement of the dollar, which had been influenced by United States interest rates as well as by speculative behaviour; (b) the slow growth of demand in other industrialized countries, which on the whole had been following restrictive macroeconomic policies; and (c) the import cutbacks and intensified export drive of developing countries, made in response to the deterioration of their terms of trade, high interest costs on debt and contraction of lending.

The trade deficit and rapidly-mounting indebtedness of the United States were generally perceived to be dangerous threats. Nevertheless, the major economic powers had proved unwilling to change their policies either on their own or in concert. The United States had been reluctant to undergo recession; the other major countries had been reluctant to stimulate demand in their own economies, and both the United States and the other major countries had been reluctant to take the measures needed to permit developing countries to increase imports and reduce their debt-related trade surpluses. Consequently, the brunt fell on the dollar's exchange rate against other major currencies. In 1985 and early 1986 the depreciation of the dollar was actively encouraged through international policy co-ordination. Subsequent efforts at co-ordination have sought to stabilize the dollar at a lower level.

Trade volumes have been showing some response to the currency realignment. However, the size of that response has not yet been commensurate with that of the realignment.

United States businesses have been finding it difficult to increase their share of the United States and foreign markets. Many Western European and Japanese firms that had gained at the expense of the United States - often at great cost - have preferred to cut their profit margins rather than lose sales volume because the inadequacy of world demand has limited their ability to switch to other markets.

As already noted, a number of countries in East Asia have recorded payments surpluses. But for almost all other developing countries, the trade surplus (or deficit reduction) reflects an involuntary net outflow (or reduced inflow) of resources mainly due to the overhang of debt. Without additional net financing, the United States balance with them will improve only to the extent that the cheaper dollar prompts a shift in their imports towards the United States or in their exports away from the United States. However, developing countries' exports of manufactures cannot be easily diverted to Japanese and Western European markets, partly because of access problems. Moreover, import levels have been greatly reduced, and much of what remains is often not quickly switchable. As already mentioned, a number of developing countries, especially oil-exporting developing countries, have been making heavy import cuts.

Slow growth of the world economy has not only increased the need for dollar devaluation and blunted its impact on payments balances. It has also made the devaluation accentuate the slow-down in activity:

- Owing to the slow response of United States import and export volumes to the dollar's depreciation, and to factors such as the reduced demand from oil-producing countries and regions and low rates of capacity utilization in manufacturing, the currency realignment has not been triggering an increase in investment and activity levels in the United States;
- The realignment is, however, having a strongly depressive impact on the appreciating countries. This is mainly because investment for export (or import substitutes) has been made less profitable by the reduction of sales prices expressed in domestic currency. In some cases, the mark-up on sales was large enough for this not to depress profit margins to abnormally low levels; the fall in oil and other raw material costs has also helped. But in other cases, firms appear to have cut their mark-up over marginal production costs to almost nothing instead of suffering the even bigger profit losses they would have incurred if they had instead curtailed output or intensified competition in their home markets. The reduction in overall home activity caused by investment cuts is offsetting in part the positive impact on imports of currency realignment; and it is making it even more difficult for surplus countries to re-direct exports to the home market.

The central banks of surplus countries are purchasing dollar-denominated instruments (mostly United States Government liabilities) on a massive scale in order to make up for the deterioration of market confidence in that currency; indeed, net private flows to the United States in the first quarter of 1987 were negative. Official purchases may succeed in shoring up the dollar, but they will not reduce the United States trade deficit. Sustained and reasonably rapid progress in reducing the deficit is imperative, not only to restore credibility in currency markets, but also to meet the trade-balance objectives of the United States authorities and the market growth objectives of business and labour; otherwise, protectionism will remain a very potent threat. Correcting the deficit will not be an easy task, since even to hold the current account deficit constant over time, the pace of export growth will need to exceed the pace of import growth by some 70 per cent.

A viable solution to the problem of the United States trade deficit will therefore require an expansion of demand in the countries that have appreciated (and those developing countries that are running large balance-of-payments surpluses); and, no less important, a combination of new flows and debt relief for financially constricted countries. It will also be necessary, over the longer-term, to eliminate the structural component of the United States budget deficit. However, a sharp cut in government expenditure or rise in taxes in the near term would reduce the trade deficit at the cost of further lowering the pace of GDP expansion. Expansion in the rest of the world would itself lower the actual budget deficit, and increase savings, by enlarging United States incomes and the tax base; a reduction of United States interest rates would also reduce government expenditure without putting downward pressure on growth.

The deflationary gap in Japan

With the United States no longer willing to incur massive trade deficits, Japan needs alternative markets. A programme which combines a vigorous stimulus to domestic demand with finance for developing countries has been announced. However, the less the recycling and the slower its implementation, the greater will be trade conflicts and the risk of recession.

The dependence of Japanese growth on trade surpluses stems from the chronic imbalance between the private sector's propensity to save and willingness to invest which emerged with the ending of the boom of the late 1960s and early 1970s. Initially, the surplus was absorbed by budget deficits. In the 1980s, however, fiscal policy has been highly restrictive, while the savings gap has continued to widen as business investment has fallen relative to profits. Only a quarter of the surplus has been taken up by net government expenditure; the rest has been absorbed by other countries. By withdrawing fiscal support to domestic demand, Japan has, in effect, exported its potential unemployment.

The determination by the United States to improve its trade balance means that Japan will have to generate larger trade surpluses with its other trading partners (or finance a deterioration of their trade balances with the United States) and expand domestic demand. Otherwise, the loss of net exports will depress output and employment; and the private sector's surplus of savings will eventually either be extinguished as profits are reduced and/or absorbed as the fiscal balance undergoes an unplanned deterioration. Indeed, such tendencies are already at work following the appreciation of the yen.

Redirecting Japanese exports from the United States to Western European markets is not a feasible option, and attempts made by firms to do so have been meeting stiff resistance. Consequently, if Japan is to continue running large export surpluses, the imports of developing countries will need to rise relative to their exports. This will only be possible if they are provided the necessary finance. A WIDER Study Group chaired by Dr. Okita has proposed that Japan should take an initiative to launch a five-year programme of resource transfers from surplus countries to developing countries at an annual rate of $25 billion.

The scope for recycling purely through market mechanisms is circumscribed by a number of factors, including the overhang of debt (especially for Africa and Latin America). Consequently, strong official support of various kinds will be necessary. In any event, if the recycling is to succeed in improving the overall trade balance of the developed market-economy countries, and thereby add to world trade and growth, it will be necessary to ensure that the new financing does not displace other sources of financing and is not absorbed by debt-service payments by the recipient countries. There is thus a strong case for combining recycling by Japan (and other surplus countries) with a restructuring of the outstanding debts of heavily-indebted developing countries.

The domestic market in Japan could be enlarged by redistributing national income in favour of wage-earners (for example, via a tax-based incomes policy) and by adopting fiscal and monetary policies designed to increase private expenditure (particularly on housing) and public investment. In view of the deflationary gap in the economy, a programme of developing social and economic infrastructure by the public sector, if combined with an accommodating monetary policy, would spur, rather than "crowd out", private investment.

There is a growing recognition in Japan that expansionary measures at home are needed if the external imbalance is to be corrected in the context of continued rapid economic and social development. This recognition is reflected in the $43

billion programme (consisting mostly of public sector spending) announced by the Japanese authorities in May 1987, almost all of which is planned to take effect during fiscal 1987. This fiscal stimulus will not make up fully for the tightening since 1980; but at 1.8 per cent of GNP, it compares favourably with the stimulus provided by net government spending in the United States since 1981. In addition, housing investment is to be promoted by such measures as expansion of loan facilities; some import-promotion measures are also planned.

The Government has also announced plans for an increase in financial flows to developing countries. The implementation of the Third Medium-Term Target of doubling ODA in seven years will be advanced by two years, and about $20 billion in new untied public and private funds will be recycled over the next three years. The actual implementation of the recycling is envisaged to include increased government contributions to multilateral development banks; additional borrowings by such institutions in the Tokyo financial market; co-financing with the World Bank and other multilateral development banks; direct untied loans by the Export-Import Bank of Japan; and special measures for sub-Saharan Africa and other least developed countries, including increased grants and debt relief.

It is to be noted that this programme implies that ODA will be about half the international target of 0.7 per cent of GNP. Moreover, as long as the borrowing power of multilateral development finance institutions remains unchanged, additional borrowing by them in the Tokyo market will not serve to enlarge their overall lending.

If the new fiscal programme is implemented as planned and accompanied with a larger recycling programme (for example, along the lines advocated by the Okita Report), a major contribution will have been made towards both reducing trade conflicts and revitalizing growth and development in Japan and developing countries.

Profits and growth in Western Europe

Falling raw material and labour costs have been increasing business profitability in Western Europe, but without triggering the rise in investment that policy-makers were counting on. Adequate growth in output and employment will continue to be absent as long as the more favourable "supply-side" situation that has been created is not matched by more vigorous growth in demand, at home and from developing countries.

The slow growth, low investment and high unemployment experienced by Western European countries during the 1970s was widely attributed to the drop in profit shares and rates of return in that decade due to a rise in import costs and acceleration of wages. The medium-term financial strategies adopted by those countries at the end of the 1970s therefore sought not only to reduce inflation but also to restore profit margins.

The Governments concerned have succeeded in meeting both these objectives. The collapse of non-oil commodity prices and flattening of oil prices during 1980-1982 was largely used to achieve disinflation. However, the subsequent declines in oil and other material prices and the sharp deceleration of unit labour costs have largely served to raise profit margins. As a result, production costs have been pushed back to their pre-1973 levels relative to selling prices. This has allowed the share of business profits in national income to rise above its pre-1973

level; rates of return and profit shares in manufacturing have in general also recovered.

Nevertheless, the level of investment has failed to respond. The average rate of growth of gross fixed capital stock in manufacturing has been lower during 1983-1986 than during the 1970s and early 1980s. Despite the increase in profit shares, gross investment in manufacturing is absorbing the same share of value added as in 1973-1979 in France and the Federal Republic of Germany and a lower share in the United Kingdom.

Moreover, investment in manufacturing since 1982 has not added to employment. In the Federal Republic of Germany, France and the United Kingdom the number of persons employed in manufacturing was lower in 1986 than in 1982 despite higher rates of capacity utilization; the decline was particularly sharp in France. The rise in unemployment has reflected not only capital deepening but also accelerated obsolescence. The decline in the rate of addition to the net capital stock due to slow investment, together with rising labour productivity, account for much of the rise in unemployment.

Thus, despite greatly improved "supply-side" conditions, the expected response from private-sector investment has not been forthcoming. Increased profitability and favourable cost conditions may be necessary for achieving better levels of investment and employment, but they are not sufficient; demand also needs to be buoyant. Largely because of the weak growth of domestic and developing country demand, firms have not been inclined to invest in order to expand capacity.

Unless, therefore, governments expand domestic demand by relaxing their macroeconomic policies and/or increase net exports by enlarging the net flow of finance to developing countries, firms will continue to restrict their investment to what they need to maintain their market shares and profitability, through rationalization, increasing efficiency and reducing prime costs.

Investment in Western Europe and elsewhere has also been discouraged by high real interest rates, which have not only raised the required rate of return but also forced firms to restructure their balance sheets. Uncertainties since the late 1970s produced by sharp swings in exchange rates and interest rates have also deterred capital formation by raising the risks of investment and the required rate of return; so more recently, have uncertainties about policies and protectionism. These considerations make it all the more necessary to co-ordinate macroeconomic policies in order to attain more balanced growth, avoid wide swings in monetary policy, lower interest rates, reduce exchange-rate instability and secure a more predictable trading environment.

TECHNOLOGY AND COMPETITIVENESS

In addition to the global macroeconomic disequilibria discussed above, governments also need to focus attention on forces underlying structural change and the evolution of international economic relations. Technology is one of these forces and is linked closely both to the direction and composition of international trade and to the process of economic development. For a growing proportion of world output the ability of countries to compete internationally is increasingly based not so much on inherited natural advantages, the muscle power of workers, or the capacity to save, as on technological knowledge accumulated by individual enterprises either through their own efforts or by acquiring such knowledge from other enterprises and industries.

Because a number of countries have been catching up with the United States, the ability to generate new technology is now shared more widely. The resulting acute rivalry among leading industrial powers and between them and a group of rapidly growing developing country exporters of manufactures is adding to the tensions already being generated by the slow growth of the world economy, increasing the danger of a trade war characterized by "technological" protectionism. If this danger can be averted the increased technological competition would help to stimulate international trade and economic growth by driving down the cost of technology and widening the spectrum of choices open to technology buyers. But most developing countries are not currently benefitting because indebtedness, depressed commodity markets and the stagnation of their economies are constricting technology inflows.

As measured by the most widely used science and technology indicators, the United States is the largest single source of innovative activity, accounting for 33 per cent of the $265 billion in global research and development (R and D) spending and 18 per cent of the 216,000 domestic patents registered in the world in 1983. In terms of the number of scientists and engineers devoted to R and D activities, the largest innovative effort is in the Soviet Union. However, owing to the more rapid increase in measured innovative efforts of Japan and, to a lesser extent, a number of other developed countries, the gap between these countries and the United States has diminished since 1970.

The behaviour of productivity estimates and technology flows also suggests that the leading competitors of the United States are catching up. They have narrowed the gap with the United States as sources of international flows of technology. Technology-related statistical indicators for developing countries still show a low level of performance which, however, has been generally improving over time.

A decided shift has been taking place in the shares of major exporting countries and country groupings in world trade in manufactures which parallels the shift in the relative importance of the same countries as sources of technological innovation. For example, the Federal Republic of Germany realized positive trade balances in high and medium R and D intensity manufactures, whereas the United States is the only country having earned a positive trade balance exclusively in high R and D intensity industries throughout the period. On the other hand, Japan is unique among developed countries in having achieved consistently positive trade balances in high, medium and low R and D intensity manufactures. The behaviour of export market shares for different countries is similar to that of trade balances but also shows that:

- Most strikingly, all of the major developing country groupings, including the less advanced developing countries and the African countries, have, up to 1980, succeeded in increasing their respective shares in the imports of the developed market-economy countries in each of the three R and D intensity categories of manufactures; however, the increase tapered off thereafter;
- The performance of higher-income Asian and Latin American countries outpaced that of the remaining developing countries and increased the already significant gap between the two groups.

Experience in individual industries, including the five considered in this report (semiconductors, TV receivers, automobiles, steel, and textiles) highlights both the importance of technological change in the evolution of industries and the variety of ways in which technological innovation and imitation in production processes and products combine with firms' overall strategies to affect the international competitiveness of countries. For example, competition between firms of different countries in the high R and D intensive industry, semiconductors, is based on leads (or lags) in introducing product innovations, on steep learning curves (sharp reduction in unit costs with the accumulation of experience) and innovations in process technologies. In the more mature TV and automobile industries competition is based on ability to achieve a high degree of manufacturing efficiency and economies of scale, as well as important organizational innovations (the famous 'just in time' method of inventory control) with many of the product and process innovations originating in other industries. No uniform pattern of evolution of technology emerges from the experience of different industries. However, one common feature in all instances is the necessary process of company-specific and country-specific learning and organizational change which accompanies innovation and is an integral part of it.

Of the many factors that influence the degree of innovativeness and technological dynamism of the enterprises of a country in a particular industry, government policies rank high. Indeed, the need to foster technological innovation has caught the attention of decision-makers in almost all countries over the past decade. Strategies, promotional measures and incentive schemes have been adopted in many countries, in order to stimulate technological advance in a wide range of sectors. Thus, technology issues are moving to the heart of national economic policy and are becoming part and parcel of overall government policy-making. These policies influence not only the generation of technology, but also its transfer and exchange among countries.

Depending on the degree of technological development of the countries adopting them, policy instruments affecting the transfer of technology are aimed either at ensuring an adequate protection for technological assets of domestic firms or at improving access on fair and equitable terms and conditions to foreign technologies. However, the two objectives are not mutually exclusive. These policies are constantly evolving in view of the changing economic and technological position, and of the commercial interests, of the countries concerned. One area that is receiving increasing emphasis by government decision-makers, especially in the developed countries, is that of intellectual property protection and its relationship to international trade in the area of high technology.

Most developing countries are far more dependent than developed countries on imported technological inputs as a complement to their own R and D and skill acquisition efforts. Forces which affect the capacity of developing countries to acquire technology from abroad, therefore, necessarily influence their ability to transform their economies and, in particular, to improve the competitiveness of their industries. The acute difficulties with regard to external payments and growth performance experienced by many developing countries in the past several years appear to have significantly constricted the traditional channels through which technology flows to them. The cut-back in imports required by debt and payments problems has fallen heavily on imports of capital goods. The poor economic prospects of developing countries have caused foreign direct investment to decline, in some regions quite sharply, and technical assistance flows have stagnated. Moreover, the information that is available on payments of royalties

and fees shows no indication that licensing of patents has been able to take up the slack caused by the decline in the other channels of technology transfer.

For many developing countries, the curtailment of technology flows is already calling into question the recent advances in export performance. It comes at a time when they had only just begun to bring modern technology to bear on a substantial part of their economic activity. However, a few relatively more advanced developing countries have not experienced with as much acuteness the problems of growth, debt and external payments constraints, and their technological advance can be expected to continue at a rapid pace. Thus, the forces currently at work appear to be depressing technology flows to developing countries in general, while increasing the differences in technological capabilities among them.

Although technology flows to developing countries have generally fallen off in the last few years, a number of developments have contributed to a diversification of such flows, a process which began in the early 1970s. Policy measures by host-country governments relating to foreign direct investment and transfer of technology and the growing technological capabilities of local firms have contributed to a partial superseding of majority-owned foreign direct investment by technology transfer in other forms such as joint ventures, licensing, machinery imports and construction of turnkey plants. Other actors have widened the options open to developing countries: notably, specialized machinery and equipment manufacturers and small- and medium-size enterprises in developed market-economy countries; and countertraders and enterprises in other developing countries and in the socialist countries of Eastern Europe.

The increased convergence in export competitiveness between the United States and Japan, and between many developing and developed market-economy countries, appears to reflect diminished differences in technological capabilities. A similar but more modest narrowing of the gap between the socialist countries of Eastern Europe and the developed market-economy countries is also discernable. With the convergence in technological capabilities and competitiveness, the landscape for technology transfer and international trade is undergoing transformation. Intensified rivalry between the leading players is driving down the cost of technology, diversifying the sources of technology flows and broadening the options for buyers of technology. In an improved global economic environment, these developments could only serve to stimulate international trade and growth.

But the intensified rivalry is also having a pronounced effect on the manner in which international trade is being conducted, which could have adverse effects on the volume of world trade. During the two decades preceding the 1970s the United States was the undisputed leader in the development and application of industrial technology. Other countries sought to close the technological gap between themselves and the United States by acquiring United States technology or by developing their own. As the technological capabilities of the other industrial countries rose in relation to those of the United States it was possible for them to "target" specific areas for concentrated technological effort. This targeting frequently produced advances which allowed other industrial countries to challenge successfully the United States' technological supremacy. Often, the targeted industry was provided with sufficient protection in its own market to ensure its profitability during the period of rapid technological transformation.

Initially, this process did not provoke sharp and concerted reactions from the United States. However, as the range of activities over which it was losing its own technological superiority grew larger, this practice gave rise to increased trading tension. Indeed, rapid technological change has combined with slow growth and misaligned exchange rates to produce sharp tensions between the United States and its major trading partners. Much more than skilful *ad hoc* diplomacy is called for in order to avert a full-scale trade war.

Two specific features of contemporary technological change can be singled out as having an important bearing on international trade competition:

- One is what appears to be a secular trend towards a generalized decline in the material intensity of production (consumption of raw materials per unit of output), which may be qualitatively distinct from the kind of substitution between materials that has always accompanied industrialization in the past;
- The other, which is in part related to the first, is the widespread diffusion of a cluster of radical technological changes which constitute the microelectronics revolution.

The first feature is affecting the competitiveness of or, more precisely, the long-term demand for a wide range of raw materials, many of which are exported by developing countries. The technologically induced decline in materials intensity in industrialized country markets lends special importance to action aimed at the diversification of commodity production, achievement of higher stages of materials processing within developing countries and related measures to increase the productivity and competitiveness of the primary sector and to develop new end-uses for existing raw materials.

The second feature has implications for the nature of competition in many industries in that it sets a premium on the ability to adapt to and master electronics-based innovations, and influences the considerations governing the international location of production. The originally predicted adverse effects on developing-country exports of the microelectronics revolution in the North have not yet materialized, in part because of the slower-than-expected diffusion of such technologies. Although the labour cost advantage of developing countries as a location for production has diminished as a result of computerized integration of manufacturing, robotics and similar innovations, the effects on individual products are influenced by a number of factors, including the existing ability of particular developing countries themselves to absorb the new technologies and their past experience in the industry, which makes it difficult to predict the actual outcome on competitiveness. The evidence shows that neither a massive relocation of industry to the North nor a drastic reduction of developing countries' export prospects are likely in the medium term.

Fortunately, much can be done by developing countries themselves to benefit from, rather than be left behind by, technological progress. A first step for many countries is the setting up of appropriate institutional mechanisms to integrate technology into the mainstream of macro-economic management and policy-making. This implies the striking of a balance between short-term stabilization and adjustment objectives with longer-term trade and development objectives.

There also needs to be emphasis on policies that stimulate the demand for innovations, fuller assessment of the trade-offs between the private-reward function of patents and their function as a conveyor of information, and the exploitation of vast opportunities for productivity-increasing organizational innovations both at the firm and the sectoral level. Prospects for regional and subregional technological co-operation have improved in recent years, which suggests continued possibilities for the exploitation of complementarities between developing countries at different stages of development.

Given the profound structural changes taking place in the world economy, the increasing interdependence and multipolarization of relations and the accelerating pace of technological change, it is more essential than ever to incorporate the technological dimension into the formulation of development strategies, especially with a view to the enhancement of the international competitiveness of a country's industries.

K.K.S. Dadzie

Part One

INVESTMENT, GROWTH AND DEVELOPMENT IN THE WORLD ECONOMY

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Chapter I

RECENT DEVELOPMENTS IN THE WORLD ECONOMY

A. Introduction

An unsatisfactory and declining pace of economic growth has characterized the world economy over the last 15 months; it is now moving close to the edge of recession. While a handful of developing countries performed well, output of these countries as a whole increased by a little more than 3 per cent in 1986.[1] It is a commentary on the state of the world economy that this was the largest gain yet attained in the 1980s, a figure well below performance in the 1970s or 1960s.

The performance of developing countries was strongly influenced by the evolution of commodity and capital markets. The plunge in oil prices affected adversely those oil producers that did not expand production, while providing scope for import expansion in oil-importing countries. Non-oil commodity prices as a whole remained more or less unchanged in 1986, with prices rising for food and tropical beverages while declining further for non-food commodities.[2] For developing countries as a whole, the terms of trade deteriorated in 1986; in some countries the drop was such that real incomes were reduced. In a large number of countries faster growth was accompanied by a worsening of the trade balance, while in others it was supported by increased external earnings owing to higher prices for a key export commodity, i.e. coffee. In both cases growth performance depended on circumstances that could not be sustained; by mid-1987 it was clear that growth in both groups of developing countries would be less than in 1986.

Financial flows to developing countries remained largely unchanged at the low levels prevailing in 1985. Because of their debt overhang, developing countries have not been able to participate in the vigorous expansion of private international lending that occurred in 1986 and has continued into 1987. The renegotiation of debt owed to commercial banks has proved increasingly difficult, and securing new money even more so. In mid-1987, major United States banks made sizeable provisions against losses on their loans to developing countries, raising questions concerning the extent to which they would be a source of financing for these countries in the future.[3]

As the main beneficiaries of the terms-of-trade movement referred to above the developed market economies were widely viewed in the early months of 1986 as enjoying favourable growth prospects. In the course of 1986 and the early months of 1987, however, these optimistic expectations have been progressively scaled down. For 1986, as a whole, total output of developed market economies grew by some 2.4 per cent and present esti-

1 See table 1.

2 For further discussion of the recent behaviour of commodity markets, see Annex 2.

3 For a discussion of capital flows and related issues, see Annex 4.

Table 1

WORLD OUTPUT BY MAJOR COUNTRIES AND COUNTRY GROUPS, 1980-1985, 1985 AND 1986 AND FORECASTS FOR 1987

(Percentage change)

Country or country group	1980-1985 (Annual average)	1985 Actual	1986 Estimated	1987 Forecast [a]
World	2.3	3.0	2.8	2.7
Developed market-economy countries [b]	2.2	2.8	2.4	2.3
of which:				
North America	2.5	2.8	2.5	2.4
Western Europe	1.4	2.4	2.3	2.2
Japan	3.8	4.5	2.2	2.5
Others	2.2	2.4	0.9	2.1
Developing countries and territories [c]	1.3	2.2	3.2	2.9
of which:				
Latin America	0.2	2.8	3.3	3.6
North Africa	2.6	2.8	1.0	2.6
Other Africa	-0.5	2.9	0.7	0.7
Other Africa ex. Nigeria	2.1	3.4	3.0	2.8
West Asia	-1.8	-0.8	1.9	-0.5
South Asia	5.1	5.2	5.0	5.0
East Asia	5.2	1.9	5.1	5.3
China [d]	9.8	12.3	7.4	7.5
Socialist countries of Eastern Europe [d]	3.5	3.2	4.3	4.1

Source: UNCTAD secretariat calculations, based on official national and international sources.

a See *Trade and Development, 1985*, note ***b*** to Annex table A1.

b Gross domestic product/gross national product.

c Gross domestic product.

d National income.

e Net material product.

mates place growth for 1987 at 2.3 per cent.[4] Recent economic performance and future prospects in these countries are closely related to the manner and speed with which the large trade imbalances among them are reduced. These imbalances have triggered sharp changes in exchange rates whose effectiveness in adjusting them has yet to be demonstrated. They have also provoked a sharp escalation in trade conflicts that threaten to unravel the multilateral trading system.[5]

In the socialist countries of Eastern Europe, performance improved over the earlier years of the 1980s, with economic growth (NMP) amounting to 4.3 per cent in 1986; a

4 See table 1.

5 For a discussion of recent trade actions, see Annex 5.

slight weakening in performance is expected for 1987.

In China the pace of expansion, as measured by national income, decelerated to 7.4 per cent in 1986.

B. Developing countries

1. Overall progress and prospects

Output in developing countries as a group rose marginally in 1986, to an annual rate of 3.2 per cent, but this slight improvement does not presage a fundamental shift in these economies towards sustained recovery. On the contrary, since economic activity in the developed market economies continues to slacken, since interest rates in the United States are rising and since the debt burden remains no less onerous, the rate of growth in output is expected to slip back in 1987, to a currently estimated annual rate of about 2.9 per cent.

The progress made in 1986 was not on a broad front. Recent trends have done nothing to break the pattern of weakness in primary commodity prices that has been a characteristic of the world economy since the beginning of the 1980s. For the great many smaller developing countries largely dependent on primary commodity exports, the continued weakening of prices in 1986 has served only to intensify the considerable difficulties which they have been facing in adjusting to the post-1980 environment of sluggish economic growth, high real interest rates and sharply curtailed capital flows. With the dramatic decline in oil prices in late 1985, the oil-exporting countries have become another group of countries facing difficult export conditions. In fact, the gain in output of developing countries during 1986 can be traced mainly to the comparatively vigorous growth of some of the larger countries in Latin America and in South Asia and of the exporters of manufactures in East Asia. In not all these countries, however, has the advance in 1986 been readily sustainable; for some, the gain was achieved in circumstances that cannot, or will not, be replicated in 1987.

Among the larger countries, those in South Asia continued their record of earlier years of the present decade and realized substantial growth in output during 1986. Their sustained progress in a discouraging international environment has been helped by the scale and diversity of their productive structures; in addition, the external constraint has been eased in these countries in recent years because of policies pursued to promote exports of manufactures and because of relatively light debt burdens. Growth in these countries is expected to remain unchanged in 1987.

Two of the largest countries in Latin America - Argentina and Brazil - also experienced substantial growth in domestic demand and output during 1986, providing a stimulus to output among their smaller trading partners within the Latin American region. As two of the most heavily indebted countries, however, the external constraint has limited their room for maneouvre, despite the size and flexibility of their economies. The immediate reason for the growth in output during 1986 was the adoption of unorthodox anti-inflation programmes. In the face of accelerating inflation, which had reached high levels in 1985, both countries adopted programmes intended to break inflationary expectations. Wage and price controls were introduced and exchange rates were fixed. Rates of inflation fell dramatically while the growth of output recovered or was sustained. However, insufficient control of the growth of real incomes led to consumer booms and a deterioration in the balance of payments on current account. Brazil suspended interest payments on its external debt in February 1987 and later introduced a programme to restrain demand. Peru, which had earlier put a ceiling on debt-service payments, was a third country in the region which recorded high growth in 1986.

The East Asian exporters of manufactures were other countries whose economic growth in 1986 was aided by special circumstances. After experiencing a strong advance in exports in 1984, thanks to the buoyancy of their principal export market - the United States - they found their growth slackening in 1985. In 1986, however, these countries again saw their exports boom as the large appreciation of the yen and the relative stability of their own currencies against the dollar allowed

Table 2

WORLD [a] TRADE SUMMARY: ANNUAL RATES OF CHANGE IN VOLUME AND PRICES BY MAIN COUNTRY GROUPS IN 1985 AND 1986 AND FORECASTS FOR 1987

(Percentage)

Country group	1985 Actual	1986 Estimated	1987 Forecast
World			
Export volume	2.3	4.0	3.0
Developed market-economy countries			
Export volume	3.5	1.7	3.4
Terms of trade	1.0	9.9	0.2
Purchasing power of exports	4.5	11.8	3.6
Import volume	5.4	7.7	4.0
All developing countries			
Export volume	-0.6	10.0	1.7
Terms of trade	-3.0	-23.2	-2.6
Purchasing power of exports	-4.0	-15.5	-0.9
Import volume	-5.8	-7.9	-2.5
Oil-exporting developing countries [b]			
Export volume	-4.6	13.2	-3.2
Terms of trade	-3.1	-31.2	-1.2
Purchasing power of exports	-7.7	-22.1	-4.4
Import volume	-9.4	-19.7	-9.9
Net oil-importing developing countries [c]			
Export volume	3.0	7.4	3.0
Terms of trade	-2.9	-0.3	-3.7
Purchasing power of exports	-0.7	7.1	-0.8
Import volume	-3.3	3.2	1.1

Source: UNCTAD secretariat calculations, based on official national and international sources.

Note: The terms-of-trade calculations for groups of countries have been made by the UNCTAD secretariat using a methodology briefly described in the UNCTAD *Handbook of International Trade and Development Statistics, Supplement 1985* (United Nations publication, Sales No. E.F.85.II.D.12), p. 536.

a Excluding China and the socialist countries of Eastern Europe.

b Major petroleum exporters *plus* Bolivia, Egypt, Malaysia, Peru and Tunisia.

c All developing countries *less* oil-exporting developing countries as defined above.

them to increase significantly their exports, despite sluggish growth in trade in manufactures. They also benefited from the decline in oil and non-oil commodity prices and, in the case of debtors, from lower interest rates. Sharply rising current-account surpluses, however, provoked calls from the main trading partners for revaluation of their currencies and for steps to raise their imports. The growth of these countries in 1987, though remaining strong, is expected to be lower.

For the many primary commodity exporting countries - although there have been

exceptions because of special developments in their particular commodity markets or because of particular advances in domestic output unrelated to their external sector - the external environment has not favoured domestic economic growth. The difficulties have been particularly severe for the numerous smaller economies heavily dependent on foreign trade. Many of these economies are in sub-Saharan Africa, where long-standing internal problems of agricultural production and internal management are compounded by debt-service burdens. Since oil accounts for a smaller share of these countries' imports and since their debt is owed largely to official creditors and carries fixed interest rates, their gains from lower oil prices and interest rates have been limited. The adjustment programmes introduced earlier by several of these countries both to contain real domestic expenditure in an orderly way and to stimulate longer-term growth have had to carry the burden of further retrenchment in view of the serious deterioration in their terms of trade. Some have sought relief through the postponement of debt-service payments. The growth in agricultural production, the main determinant of domestic output, returned to a slower rate in 1986 after the recovery that took place in 1985 following the cessation of the drought.

Among the net oil-exporting countries, there was an increase during 1986 in oil production and exports as countries sought to offset the decline in price by an increased volume of sales. The counterpart was the substantial accumulation of oil stocks which took place in the developed market economies. For the oil-exporting countries as a group, the terms-of-trade loss from the decline in the price of oil and the increase in the price of manufactures came to around $100 billion, or close to 10 per cent of their GDP. The increase in the volume of exports which, for some countries has been spectacular,[6] limited its impact on the trade balance, resulting in a $50 billion deterioration. External payments difficulties, however, in a number of countries necessitated additional adjustment through further cuts in imports. The curbing of expenditures necessary in many countries led to an overall decline in output. For 1987, the expected decline in oil production in some countries members of OPEC, which will result from the agreement reached by OPEC in October to reduce aggregate production, together with the need for further adjustment, will continue to limit output growth in these countries.

For the developing countries as a group, the worsened terms of trade brought about by the glut in world commodity markets has necessarily constrained their capacity to import. In fact, the volume of exports of the developed market economies to the developing countries fell in 1986, significantly braking the internal growth of the latter, and the volume of total imports into the developing countries also declined despite increased trade among the developing countries themselves.[7] Though the volume of exports rose significantly and though interest payments declined, these were not enough to offset the deterioration in the terms of trade, and the current-account deficit of the developing countries as a group worsened appreciably, especially for countries in Latin America and West Asia.[8] For the oil-importing countries, however, the fall in oil prices effected a saving of some $30 billion in their oil import bill. This, together with lower interest payments allowed the oil-importing countries to accommodate a moderate increase in the volume of their imports within the framework of a reduced current-account deficit.

With the availability of external financing roughly unchanged, the increase in the current-account deficit of the net-debtor developing countries was financed entirely by changes in reserves: the level of official reserves held by these countries fell by $8 billion in 1986, of which $2 billion reflected repayment to IMF.[9] The further weakening of export prices provoked further rises in the ratio of debt outstanding to exports; lower interest rates allowed this to translate into an unchanged ratio of debt service to exports.[10]

2. *Latin America*

The overall picture of developments in Latin America and the Caribbean in 1986 was particularly complex, first because of the contrasting or uneven impact of developments on

6 Although the growth in the volume of exports was exceptionally strong in Saudi Arabia, which in recent years has borne the brunt of production declines caused by the OPEC policy of supporting the price of oil, most oil-exporting countries significantly increased the volume of their exports.

7 See table 2.

8 See table 5.

9 See table 3.

10 See table 4.

Table 3

DEFICIT OF NET DEBTOR DEVELOPING COUNTRIES: [a] SOURCES OF FINANCING IN 1985 AND 1986 AND FORECASTS FOR 1987

(Billions of dollars)

Item	1985 Actual	1986 Estimated	1987 Forecast
Current-account deficit	37.8	48.1	50.8
Source of financing:			
Increase in official reserves	3.1	-8.1	-4.7
Total net capital flows	40.9	40.0	46.1
Official bilateral flows	17.5	17.7	17.1
Grants [b]	12.4	12.9	13.1
Medium- and long-term loans	5.1	4.8	4.3
Multilateral institutions	12.9	13.5	14.2
Private flows	14.0	13.4	16.1
Direct investment	7.9	7.4	7.4
Other private flows			
Medium- and long-term flows	9.0	10.2	10.5
Short-term flows	-2.9	-4.0	-1.8
IMF lending	0.6	-2.1	-1.3
Other capital, unrecorded flows, errors and omissions	-4.1	-2.5	-
Memo item:			
Total interest [c] and profit remittances (sign reversed)	57.6	53.3	51.8
Net transfer	-16.7	-13.3	-5.7

Source: UNCTAD secretariat calculations, based on international sources.

a Developing countries, territories or areas other than those with net foreign assets greater than $1 billion in 1982 (Brunei, Hong Kong, Iraq, Iran (Islamic Republic of), Kuwait, Lebanon, Libyan Arab Jamahiriya, Qatar, Saudi Arabia, Singapore, Taiwan Province of China, Trinidad and Tobago and United Arab Emirates).

b Excluding technical assistance.

c Balance-of-payments basis, excluding interest on short-term credits or on IMF drawings.

individual countries and second because of the diversity in the policies pursued by them in the process of stabilization and adjustment.

Thus, while growth performance in 1986 for the region as a whole, and for the majority of countries, including some of the oil-exporting countries, was better than in 1985, the region's external position continued to deteriorate. Although this deterioration was mainly due to the sharp turnaround in the external position of the oil-exporting countries, a number of high-growth oil-importing countries also saw a worsening of their external positions. Buoyant domestic consumption and the need to revive investment, and weakness in the ex-

Table 4

NET DEBTOR DEVELOPING COUNTRIES: [a] OUTSTANDING DEBT, DEBT SERVICE AND DEBT-SERVICE RATIOS IN 1985 AND 1986 AND FORECASTS FOR 1987

(Billions of dollars)

Debt and debt ratios [b]	*1985* *Actual*	*1986* *Estimated*	*1987* *Forecast*
Debt outstanding, end of year [c]	816.7	854.0	890.0
of which:			
Medium- and long-term debt	669.1	709.0	745.0
IMF credit	35.3	36.7	35.8
Debt service on medium- and long-term debt [d]			
Medium- and long-term debt	94.7	89.1	92.5
IMF lending	6.1	8.8	10.7
Total	100.8	97.9	103.2
of which:			
Debt amortization	49.2	49.3	56.0
Ratio (percentage) [e]			
Medium- and long-term debt outstanding to exports	194.1	220.8	217.6
Interest on medium- and long-term debt to exports	14.2	14.3	13.0
Debt service to exports	27.5	27.7	27.0

Source: UNCTAD secretariat calculations, based on international sources.

a See note *a* to table 3.

b Flows (disbursements and debt-service payments) denominated in currencies other than United States dollars have been converted to that currency at the average exchange rate of the year, while outstanding debt (stock) has been converted at the exchange rate prevailing at the end of year. Therefore, the change in outstanding debt does not necessarily equal net flows and table 4 cannot be directly derived from table 3.

c Short-, medium- and long-term, including IMF drawings outstanding.

d Estimates of debt amortization for 1985 reflect actual payments. The estimates for 1986 and forecasts for 1987 have been adjusted to take into account restructuring agreements that had been agreed, in principle, up to the end of 1986.

e Debt and debt service exclude IMF lending; exports include services.

port sectors (grain prices in Argentina and drought in Brazil), led to faster import growth and slower export growth, thus contributing to the stagnation or deterioration of the trade balance which was only partly offset by savings in interest payments resulting from the drop in international interest rates. The favourable developments in the external environment had a limited effect on the smaller economies in the region on account of their productive structures, which are dominated by primary commodity exports, and of their debt structures. On the whole, however, because of higher international prices for their commodities they were able to improve their external positions. Growth performance, however, remained very low and in some countries continued to be below population growth.

Another area in which developments in 1986 have been rather mixed was inflation. Although the rate of price increase for the region as a whole was reduced, mainly as a result of the disappearance of hyper-inflation in some countries, inflation has nevertheless remained very high or has been increasing. Furthermore, in the countries in which inflation had fallen spectacularly following the implementation of stabilization programmes, it surged up again in early 1986 and in Brazil accelerated further in early 1987.

The overall GDP growth of 3.3 per cent in 1986 was the result of quite divergent performances between the net oil-exporting and oil-importing countries in the region. The growth of aggregate output of the oil-exporting countries turned negative, but there was increasing divergence in individual country performance. Increases in the volumes exported, as in Ecuador and Venezuela, limited the impact of the deterioration of the terms of trade on their external positions and on output growth. In some countries, such as Peru and Venezuela, policies were adopted for neutralizing the effect of the oil prices on domestic activity. As a result, there was even a significant improvement in their growth performance. Conversely, restrictive policies to fight hyperinflation and other adverse external developments, such as the collapse of the tin market in Bolivia, led to significant deterioration in the external position and growth performance. Similarly, Mexico's external position deteriorated radically under the impact of both declining prices and volumes of exported oil, particularly in the first part of 1986. In response to this deterioration, the exchange rate was repeatedly raised, thus providing a strong incentive for non-oil exports, which surged by 35 per cent, surpassing for the first time in recent years those of petroleum. The growth in exports was made possible by the significant slow-down in domestic demand, which resulted from stricter monetary and credit policies, new cuts in public expenditure and a decline in real wages. The slow-down in domestic demand also led to reduced imports and thus, by the end of the year, the deterioration in the country's external position was smaller than had originally been expected. Conversely, output growth became negative. For 1987, however, with the firming up of oil prices and resumed growth in the volume of exports and the easing of the financial constraints under the impact of the new debt package agreed in 1987,[11] growth is expected to resume and to reach 3.5 per cent.

In contrast to oil-exporting countries, there was increased convergence in the performance of the oil-importing countries. Their aggregate GDP growth passed the 6.0 per cent level, which was the highest level achieved since 1979 and twice as high as in 1985. Although output in a number of the smaller countries in the region grew at fairly low, although positive rates, output growth in all the larger economies was above 5 per cent.

The rise in real wages, which followed the initial deceleration in inflation rates in the countries which had undertaken stabilization programmes stimulated domestic demand and buoyed up output growth. In these countries, the strength of the demand for consumption and need to maintain large trade surpluses in order to meet debt-service payments started putting strains on the productive capacity, which had been weakened by the low levels of investment since the beginning of the 1980s. As a result, bottlenecks developed in a number of sectors and trade balances deteriorated as imports surged and exports, which were partly diverted to local markets, were hampered by external factors and bad weather. The resurgence of inflation and/or the reappearance of external financing difficulties contributed to a reduction in growth during the latter part of the year and to the dimmer prospects for continued growth in 1987.

In Brazil, GDP registered 8 per cent growth in 1986, approximately the same as in 1985, and growth would have been higher had it not been for the decline in agricultural production, due to the drought, and the impact of the Cruzado Plan on financial institutions. Following the adoption of the Cruzado Plan (see the 1986 *Report*, chapter V, section A), the rate of price increase between April and July 1986 dropped to 1 per cent a month. Furthermore, since at the moment of the introduction of the Cruzado Plan, average and minimum wages were fixed at levels 8 per cent and 15 per cent higher, respectively, than their corresponding real levels in the preceding six months, while prices were frozen, there was a significant increase in real wages. The resultant boom in consumption, in the light of the sharp declines in domestic investment during the years of the crisis, created bottlenecks in some sectors despite large increases in production and imports. The diversion of exports to the domestic market and the loss of coffee exports due to drought, together with the upsurge in the volume of imports (26.0 per cent, which offset the 10 per cent saving in the oil bill), led to a reduction of the trade surplus by almost $2 billion. Almost half of this deterioration was reflected in the widening of the deficit on current account despite a 10 per cent decrease in net interest payments due to lower interest rates. Notwithstanding the adoption of further measures in late July, and again in November, monthly inflation had risen to 16.8 per cent by January 1987, and the surplus on the trade balance had almost disappeared. Continued

11 Among other innovations, financing under the debt plan offered to Mexico will adjust itself to the contigencies of the oil market and economic growth. Credit availability is tied automatically to the price of oil. Furthermore, the country becomes entitled to additional financing for stimulating public investment and economic activity, if growth during the first half is not consistent with the set target of 3-4 per cent for 1987.

difficulties on the capital account also contributed to the reappearance of debt-servicing problems and to the announcement of a moratorium on interest payments on private debt.

In Argentina, after a 4.4 per cent decline in 1985, GDP jumped by 5.5 per cent in 1986. The easing of the wage and price controls during the early months of 1986 following the success of the Government's stabilization programme[12] led to a considerable increase in real wages in the second quarter of 1986, as wage adjustments often exceeded official guidelines. This was followed by an upsurge in consumption which, in the second and third quarters, grew at an annual rate of about 12 per cent as compared to 0.6 per cent in the first quarter. A new flare-up of inflation, which reached a monthly rate of 8.8 per cent in August, led to a new set of measures which included tighter monetary policy, wage controls and the reimposition of price ceilings on some goods and wide-ranging reforms in the civil service and State organizations. Inflation by December had been brought down to 4.7 per cent a month. Initial estimates for the last quarter of 1986 indicated that there was also a fall in demand. A positive development in addition to the buoyancy of consumption was that fixed investment, which had been declining every year since 1981, picked up significantly. It increased by 3.9 per cent on an annual basis during the first half of the year and strengthened significantly during the second half (16 per cent in the third quarter). In Argentina, the improved performance in the domestic sector was followed by a reversal of the country's external position. In line with growing consumption and investment, import growth was also significant. Moreover, being self-sufficient in oil, the country did not benefit from the decline in oil prices. Furthermore, there was a serious setback to exports, mainly because of the weakness of the grain market, but also probably because of some diversion of exports to the domestic market. Since the saving derived from the fall in interest rates was partly offset by increased debt and only partially compensated for the deterioration in the balance on trade and other services, Argentina's current-account position deteriorated significantly.

For other countries in the region, the growth of exports, which was particularly reinforced by the buoyant import demand in neighbouring countries, as well as the exceptional price rises in certain primary commodities, contributed to accelerated output growth. Colombia, Uruguay and Chile registered growth rates of around 5 per cent in 1986. The drought in Brazil and the consequent increase in coffee prices were largely responsible for the more than 30 per cent growth in Colombia's exports. However, Colombian coffee exports are expected to slow down in 1987 due to the decline in coffee prices following the recovery of coffee production in Brazil. In all three countries, however, export growth of non-traditional goods was equally important. The coming-on-stream of past investment (Colombia) and policies for supporting the expansion of internationally tradeable goods[13] (Chile) played a role. In addition, the buoyant external demand which resulted from the increased import demand in Brazil and Argentina appears to have boosted significantly intra-regional trade. The expected slow-down in intra-regional trade, as well as slower demand growth in developed countries, is also expected to affect the export growth of non-traditional goods. Therefore, growth among these countries is also expected to slow down, although still remaining fairly healthy.

For the region as a whole, however, the large negative shift in the trade balance led to a further increase in the deficit on current account, despite significantly lower investment and interest payments. The latter declined by around 13 per cent in 1986 as a result of the lower international interest rates, slower debt growth and the imposition of ceilings on interest payments by some countries. For the oil-importing countries, the reduction in these payments compensated entirely for the deterioration in the balance on trade and other services, leaving the deficit on current account at the level achieved in 1985, at around $13 billion. For the oil-exporting countries, despite an even larger reduction on this item, in absolute terms, the deterioration of their current account remained significant. Thus, the current-account deficit for the region as a whole increased by $10.2 billion, to reach $19.1 billion.[14] In view of continuing declines in capital inflows, the financing of this deficit meant a greater reduction in reserves or other assets, particularly for Brazil and Venezuela, where capital inflows have been negative.

12 The rise in retail prices dropped from a monthly average of 26 per cent in the second quarter of 1985 to 3.1 per cent in the first quarter of 1986.

13 These policies include protection of certain agricultural and industrial activities, through predetermined agricultural prices, tariff surcharges and incentives to non-traditional exports.

14 See table 5.

Table 5

CURRENT-ACCOUNT BALANCES:[a] MAJOR COUNTRIES AND COUNTRY GROUPS, 1985 AND 1986 AND FORECASTS FOR 1987

(Billions of dollars)

Country or country group	1985 Actual	1986 Estimated	1987 Forecast
Developed market-economy countries	-27.7	11.4	10.0
of which:			
Germany, Fed. Rep. of	28.4	53.8	48.8
Japan	55.6	86.3	82.6
United States	-123.8	-144.0	-141.7
Developing countries[b]	-22.4	-43.7	-36.1
of which:			
Latin America	-10.2	-19.1	-19.5
North Africa	-0.6	-8.0	-6.4
Other Africa	-4.9	-8.7	-8.4
West Asia	-4.8	-16.0	-13.3
South Asia	-8.9	-5.6	-6.8
East Asia	7.7	14.1	18.7
China	-11.4	-7.8	-7.5
Socialist countries of Eastern Europe	2.4	-2.2	-0.9
Statistical discrepancy[c]	-59.1	-42.3	-34.5

Source: UNCTAD secretariat calculations, based on official national and international sources.

a Goods, services and private transfers.

b All countries, territories and areas not included in other groups.

c The statistical discrepancy is composed of a (usually negative) discrepancy on merchandise trade, mainly due to timing asymmetries, and a positive discrepancy on services reflecting, in the main, under-reporting of interest income, receipts from sales of transportation services and remittances.

3. *Africa*

Further progress in aggregate growth of output in the countries of sub-Saharan Africa[15] has continued to be disappointing after the improvement registered in 1985 with the end of the drought. For many of the smaller countries in the region, exporters of primary products, the overall impact of external developments in 1986 on their economies has continued to be negative. Furthermore, domestic policies intended to reorient development efforts have frequently met with financial constraints in terms of both domestic resources and foreign exchange and have therefore sometimes added to contractionary forces. Even among the larger, more diversified, economies which had undertaken structural adjustment programmes recovery remained fragile. In 1986 the combined effect of a more favourable external environment and increased flows available within the context of structural adjustment programmes approved by IMF/World Bank contributed to sustained growth and an improvement in external positions. Much of this was, however, reversed in 1987 as the new de-

15 The discussion on sub-Saharan Africa in this sub-section excludes Nigeria, which, because of the size of its economy, weighs heavily in sub-regional averages that include that country. Furthermore, economic developments in Nigeria followed a somewhat different pattern, which is described separately.

terioration in the prices of primary commodities put in jeopardy many adjustment programmes and led to renewed payments difficulties. An increasing number of countries decided to abandon the austerity programmes and/or limit payments on their debts.

Output in sub-Saharan countries grew by 3.0 per cent in 1986, compared to 3.4 per cent in 1985. The main determinant of growth has continued to be agricultural production, whose expansion in 1986 came closer to its longer-term average. Thus, despite more encouraging food production in the recent past, the longer-term prospects for sustaining growth at levels above population growth remain of great concern. Even in countries where there are signs that domestic policies in favour of agriculture have borne fruit, the repercussions on other sectors of the economy have sometimes been negative over the short term, and have thus contributed to the lack of progress in their overall economic performance.

The weakness in metals markets has continued to depress the economies of countries for which metals are important exports. In Zambia, the persistence of weak copper markets led to new declines in export earnings and intensified the contractionary impact of the new structural adjustment programme adopted in late 1985 after several years of austerity. The expansion in economic activity, despite encouraging developments in food production, slowed down under the impact of sharply declining urban incomes and the increased production costs and shortages in raw materials which resulted from the liberalization of trade and of prices. During the second half of the year the success of the adjustment programme was increasingly jeopardized. Acute shortages of foreign exchange led to the suspension of the foreign-exchange auction. Social unrest led to the withdrawal of the measure to terminate food subsidies, which had resulted in more than a doubling of basic food prices. Increasing difficulties at the beginning of 1987 drove the Government to reverse most of the key policies of the IMF-sponsored adjustment programme and to impose a ceiling on debt payments. In Zaire, which has been adhering strictly to the structural adjustment programme agreed with IMF and the World Bank, growth has continued to be very slow as the anticipated foreign investment has not materialized, and the country has become a net exporter of financial resources. In order to reverse this situation, the Government decided to limit repayment of interest to 10 per cent of export revenues.

Even among the more diversified economies, growth performance remained quite mixed and continued to be dominated by the performance of their primary sectors. By and large, domestic policy measures and increased financial flows have contributed to accelerated growth only when supported by favourable developments in the markets of the primary products exported by these countries. Reduced growth occurred in those countries where agriculture lagged and there were continued foreign-exchange constraints. Zimbabwe's 1985 performance, which was due to bumper crops, was not repeated in 1986, and growth in manufacturing was compressed because of foreign-exchange constraints. Côte d'Ivoire is another country in which growth was modest in 1986 after a respectable recovery in 1985; there, too, a slow-down in the growth of agriculture was not compensated for by other sectors. The country's economic situation deteriorated further in early 1987; the weakening in the markets for most of its commodities reduced critically export revenues and led the Government to announce the inability to meet its debt payments. In Ghana, the devaluation of the cedi over the past years and the increased incentives for cocoa production have allowed the country to recapture part of the export market. Nevertheless, in 1986, weak prices, mainly reflecting conditions of oversupply, have partly offset gains in the volume of exports and limited the growth in their value. Growth in the manufacturing sector in general has also continued to be slow, with capacity utilization in some industries remaining very low, although there has been continuous improvement in the aluminium sector. In that sector capacity utilization was raised to 50 per cent, after a complete shutdown in 1984, as a result of the overhaul of the transport system and increased hydro-electric production with the end of the drought. Kenya benefited, as did other East and Southern African countries, from an improvement in its terms of trade, which led to increased imports and became the motor for economic growth.

From the above, it can be seen that the slow progress in domestic output reflects the continued difficulties which the countries of sub-Saharan Africa face in improving their external positions, since primary commodity prices, on the whole, continue to decline and any attempt to reduce the loss in the purchasing power of exports through increased volumes tends to contribute to further price declines. Thus, in 1986, while individual countries increased their earnings, it was as a result of increases in prices brought about by a contraction of supply in other countries (e.g. coffee in Brazil), rather than through increased demand. However, the supply situation has been largely reversed in 1987, and in consequence prices have started to decline. Furthermore,

the African countries have benefited less than other developing countries from other favourable developments in world trade and financial markets. Because of lower oil prices, the value of imports of the oil-importing countries of the sub-region has increased only slightly, despite an increase in the total volume of imports, leading to an improvement in these countries' trade balances. However, the slower growth of exports of invisibles and the high interest payments have left their current-account deficit virtually unchanged. This, however, combined with a deterioration in the position of the oil-exporting countries, has meant an increase in the sub-region's current-account deficit from $6.1 billion to $7.7 billion.

For Nigeria, where oil production had increased in 1985, a return to lower production levels in 1986 compounded the negative impact of the fall in the price of oil. The Government responded to the loss of revenues with severe import contraction, which in turn affected growth in the non-oil sectors. As a result, output declined and, despite a 25 per cent cut in imports, the current-account deficit turned from a surplus of $1.2 billion into a deficit of $1.0 billion.

The performance of the countries in North Africa, which comprises mainly net oil-exporting countries, was particularly affected by developments in the oil market. The decline in oil prices was accompanied by slow growth in export volumes, either because of limited spare productive capacity, or because of loss in market shares. For North African countries as a group, GDP growth dropped to 1 per cent in 1986 and the current-account deficit rose to $8.0 billion. Of the oil-exporting countries, only Algeria showed positive growth. In that country, the increasing share of refined products and natural gas in total hydrocarbon exports (crude oil does not account now for more than one third of hydrocarbon exports) and improved domestic production capacity in recent years have partly mitigated the impact of the oil-price decline on GDP. Egypt, a highly-indebted oil-exporting country, was affected both directly and indirectly by the deterioration in the oil markets. In that country a large share of foreign-exchange income consists of remittances from workers in other oil-exporting countries, and the decline in such remittances contributed significantly to increasing the payments deficit. For the net oil-importing countries, and particularly Morocco, the saving due to the oil-price decline, combined with improved agricultural production (which has limited food imports) led to an overall decline in import value. Thus, while Morocco's exports continued to decline because of weak export markets, it was able to improve its trade balance. The country also benefited from the reduction in international interest rates and a steady flow of private transfers, thus achieving a significant improvement in its current-account deficit. With the easing of the external constraint, output growth in Morocco strengthened further in 1987.

4. *Asia*

(a) East Asia

Because of their trade-oriented economies, East Asian countries have been sensitive to changes in the international environment. Thus, after a buoyant recovery in 1984, economic activity slowed down considerably in 1985, when the weakening of external markets, in particular the slow-down in the United States economy, led those countries facing balance-of-payments difficulties and high debt burdens to take measures to reduce inflation and check the growth of aggregate demand. In 1986, the spectacular increase in these countries' volume of exports not only contributed to further improvements in their external positions, but also underpinned accelerated growth in the domestic economies of most countries, although , as elsewhere, the impact on individual countries has been uneven.

In 1986, exports for the region as a whole rose by more than 10 per cent in value terms, but their growth in volume was significantly higher. While this was partly due to an increase in the volume of oil exports, it was mainly the result of increased exports of manufactures, despite a mere 3 per cent growth in the volume of world trade in manufactures. It reflected partly the continued shift in the sectoral composition of these countries' exports towards products in greater world demand, but also the impact of the realignment of key currencies in 1986. The result was a marked improvement in the competitiveness of their exports *vis-à-vis* those of Japan, since the currencies of most countries of the region have followed closely the dollar. The economies which have benefited most from this development have been the exporters of manufactures, whose rise in exports, combined with export-induced capital investment, has led to a marked acceleration of growth - from 0.8 per cent in 1985 to 10 per cent in 1986 in Hong Kong and from 4-5 per cent to around 11 per cent in the Republic of Korea and Taiwan

Province of China. In Singapore, where the economy suffered a deep recession in 1985, economic activity, although still low by historical standards, recovered earlier than expected, registering a slightly positive growth in 1986, mainly as a result of the strong export demand for refined oil products and manufactures, particularly towards the second part of the year. Exports of manufactures rose in other countries of the region and contributed either to sustaining growth, as in Thailand, where the agricultural sector performed poorly in 1986, or to preventing a sharper deterioration in performance, as in Malaysia, which suffered significant losses in terms of trade due to the decline in the prices of oil and tin.

Lower international interest rates and lower oil prices have been an important factor in the improvement of the external payments positions of most countries in East Asia. Combined with buoyant export growth, as in the Republic of Korea, the resultant savings have provided an additional stimulus to growth by reducing domestic costs and thus stimulating domestic demand. For countries like the Philippines, which, as a result of debt-servicing difficulties and political uncertainty, suffered several years of recession, the more favourable external environment contributed to arresting the downward trend in economic activity, while at the same time permitting the adoption of policies for restructuring the country's economy.

The impact of the above developments has been particularly important for the net-debtor[16] and/or oil-importing countries in the region. In view of the large share of variable-interest in total debt,[17] the saving in interest payments for net-debtor countries came to about $1.8 billion. Approximately half of this amount was accounted for by the Republic of Korea, in view of both its relatively higher level of indebtedness and the higher share of variable-interest debt in total debt. The reduction in this country's indebtedness (see below) in 1986 has contributed to an even greater decline in interest payments. Conversely, for the oil-exporting net-debtor countries, the saving in interest payments was partly offset by the need to increase their borrowing, or reduce their assets, as a result of the increase in the current-account deficits.

The favourable impact of the lower oil prices has concentrated on the net-debtor countries among the oil-importing countries, since it is in those countries that oil accounts for a large share of total imports. The saving from lower oil prices for these countries came to $4.5 billion, i.e. around 10 per cent of their import bill.

The combination of export volume growth and lower interest rates and oil prices led to almost a doubling of the sub-region's current-account surplus, from $7.7 billion in 1985 to $14.1 billion in 1986, despite the worsening in the overall terms of trade and the resumption of significant import growth, in both value and volume terms. Although, as was seen above, this improvement has been fairly widespread among the net debtor countries, the largest swing has taken place in the Republic of Korea, where a deficit of $0.9 billion was turned into a surplus of $4.0 billion, allowing it to reduce its indebtedness for the first time.

For the Republic of Korea, the improvement of its external payments position has been an important policy objective during the 1980s, because of the level of its indebtedness and of its dependence on oil imports. In 1986, the impact of the favourable developments in oil price and interest rates contributed to the improvement of the country's external position to the same extent as did the growth in exports: 55 per cent of the change in the current-account balance was accounted for by the savings from lower oil prices and interest rates. In 1987, however, the projected slow-down in the United States import demand, the appreciation of the country's currency, which partly offset the export-enhancing effect of the yen appreciation, the faster growth of imports following import-liberalization policies and the partial recovery in oil prices, are expected to halt further improvement of the current surplus. Output growth, although remaining strong, is also expected to be lower than in 1986.

The oil-exporting countries of the sub-region, which have been beset by adverse external developments in the past few years, have been taking measures in order to avoid severe balance-of-payments pressures and resort to extensive commercial borrowing. In 1986, despite intensified adjustment policies, they were not able to avoid a sharp deterioration in their external positions. Furthermore, economic growth which, in 1985, had slowed down or been negative, partly as a result of the adverse effects of austerity policies on investment expenditure and on private consumption, stagnated in 1986. In Indonesia, the deficit on

16 I.e. all countries and territories, other than Hong Kong, Singapore and Taiwan Province of China.

17 At the end of 1985, the share of variable-interest debt in total debt for the net debtor countries in East Asia ranged from 45 per cent to 77 per cent.

current account increased from around $2.0 billion in 1985 to $5.0 billion in 1986. The loss in export revenues due to the decline in the oil price was further compounded by the realignment of key currencies, which aggravated Indonesia's debt-service burden, since the public debt is largely in currencies other than the dollar. Faced with limited options in improving its external and domestic performance in the short term, the Government took measures in October aiming at medium-term reforms to raise foreign and domestic investment and to counteract the recessionary effects of the oil sector. These measures, which represent a departure from past restrictive policies, have included tariff reforms and the abolition of some non-tariff trade barriers, incentives for foreign investment and the expansion of the currency swap facility. Since these measures are expected to result in increased imports, the current-account position of Indonesia is expected to remain under pressure in 1987 despite firmer oil prices. Growth will also remain low compared to earlier years.

(b) South Asia

For countries of South Asia, 1986 saw a broad continuation of the steady growth rates of recent years, mainly due to the greater stability in agriculture, which is by far the most important sector. At 5 per cent, growth in 1986 was somewhat lower than in 1985, reflecting mainly slower growth in the larger economies of the region. In Pakistan, the gradual return of agricultural output to more normal levels in 1985 and 1986 after its sharp recovery in 1984, has contributed to slightly lower, albeit still buoyant, rate of GDP growth. In India, the modest decline in overall growth in 1986 reflected the continued weaker-than-expected performance of industrial output, which was not fully compensated by the somewhat improved performance in agriculture. The policies of the past two years designed to improve infrastructure and to relax or remove constraints in the manufacturing sector have not yet brought output growth in that sector up to the planned targets. Industrial output has continued to be constrained by infrastructure bottlenecks, despite brisk increases in power generation. Furthermore, the acceleration in consumer durables, which has been one of the leading sectors of industrial expansion, has not compensated for the deceleration in other sectors, such as capital goods, steel or textiles.

In view of the more inward orientation of most of their economies, the external sector has continued to have a relatively limited influence on growth in the region. However, the sustainability of growth at the levels which have prevailed in recent years will be increasingly dependent on the performance of the external sector. In 1986, the improvement in the external position of the countries of South Asia was limited to the larger countries, where the resumption of moderate growth in export volumes, accompanied by an improvement in the terms of trade, led to a significant drop in the trade deficit and accounted for most of the improvement in the region's external position. For the smaller countries which faced larger drops in their export prices or export volumes, trade balances deteriorated. Conversely, the impact of lower interest rates was not felt significantly since, following the 1985 increase in borrowing, and particularly in borrowing on non-concessional or commercial terms,[18] interest payments increased in 1986. This increase was, however, compensated for by better performance in services and by increased private transfers, as workers have been returning home with their savings. The combined effect of these developments has been a marked reduction in the deficit on current account for the region as a whole.

(c) West Asia

The increase in the volume of oil production and exports, which followed the OPEC decision to abandon its policy of defending the price of oil, was particularly important for member countries of OPEC in West Asia. The increase in the production of oil led to positive GDP growth in 1986 and contributed to higher output for the region as a whole. In the external sector, the increase in the volume of exports by oil-exporting countries in West Asia has been accompanied by continued significant contraction in imports, particularly in volume terms, in part induced by the severe budget cuts in many countries. Thus, despite the large deterioration in their terms of trade, which would imply a $33 billion cut in export revenues, the decline in the trade surplus of the oil-exporting countries of the region was limited to $18 billion, leaving a surplus of $8 billion. Furthermore, the continued contraction in the import of services, as well as declines in private transfers outside the region, have partly compensated for losses in net investment income resulting from the impact of lower interest rates and declining assets, thus limiting the deteri-

[18] India's liabilities *vis-à-vis* bank's reporting to BIS increased by $2.1 billion in 1985 and by $1.2 billion in 1986.

oration in their current-account position to $13 billion. For the region as a whole the current-account deficit rose from $4.8 billion to $16 billion, essentially reflecting developments in the oil-exporting countries.

The agreement by OPEC in October 1986 to reduce again its production, which has led to a firming up of oil prices, implies significant cuts in the production of oil by member countries in West Asia. While the movements in the terms of trade may be expected to leave external positions broadly unchanged, the new cut in the production of oil and continued austerity as regards the non-oil sectors may be expected to lead to sharply negative growth rates in 1987 for the oil-exporting countries in the region and to near-stagnation for the region as a whole.

C. China

During 1986, the Chinese economy showed signs of responding to the policy mix adopted by the Government in an effort to reduce the pace of expansion and the consequent imbalances which had emerged in 1984 and 1985. Despite continuing problems in certain areas which might necessitate further corrective measures and postponement of announced reforms in 1987, the performance of the economy was, on the whole, closer to planned targets. Thus, the pace of expansion of overall economic activity, as measured by the national income, decelerated significantly, from 12.3 per cent in 1985 to 7.4 per cent in 1986.[19] In terms of GNP, a concept only recently introduced to include the services sectors, the growth in 1986 was 7.8 per cent. The slow-down in growth was due entirely to a halving of the rate of growth of the industrial sector, which nevertheless expanded by 9.2 per cent.[20] In view of continued gains in real wages, demand also continued to be very strong and thus growth in light industry was higher than in heavy industry, continuing to put strains on infrastructure and on supplies of industrial inputs. Furthermore, mismatching of production and consumer demand has been a major problem. While , on the whole, production quotas have been over-fulfilled, the oversupply of unpopular products has also been on the rise reducing profits. Conversely, the emergence of shortages in popular goods has been fuelling inflation. Another problem which has plagued State-owned enterprises has been their declining profitability. Profits and taxes were down by 0.2 per cent over 1985, and production costs were up by 6.6 per cent. Various measures were announced to improve this situation, and new emphasis has been put on the role of structural reform particularly as regards the wider application of a factory-director responsibility system and the transformation of State-owned enterprises into State-owned collectively-run enterprises, leased or contracted to individuals.

Investment in fixed assets has continued to be considered excessive by the Government although significant steps have been taken to curb its growth, and to a lesser extent to improve its structure. Thus, in 1986, the rate of growth of investment in fixed assets was 16.7 per cent as compared to 38.7 per cent in 1985. For State-owned enterprises it was 15.7 per cent in 1986, with growth in capital construction limited to only 7.3 per cent. Investment to replace equipment and for technical upgrading and quality improvement expanded by 30.8 per cent bringing the share of investment in equipment to 40.6 per cent of total investment in fixed assets for these enterprises.

Rural output, which includes rural industrial enterprises, has remained dynamic, growing at 11.6 per cent. Agricultural output alone has grown by about 3.5 per cent, very close to the 3 per cent target. A satisfactory outcome in this sector has been the resumption of growth in grain output which had declined in 1985. This, however, was achieved through increases in acreage and subsidies on grain cultivation, with the consequent result of reduced growth of other crops. These measures should be seen as temporary, with improvements in

19 The figures for growth of national income, GNP and total output in this section are derived from data in constant 1986 prices.

20 This figure does not include rural industries, because the latter were previously included in agricultural output. If the output of these industries is included, the growth of industrial output was 11.1 per cent (light industry 12.7 per cent and heavy industry 9.6 per cent).

grain output in the future gained through increased inputs and better management.

Inflation, which in 1986 dropped to 6 per cent from 8.8 per cent in 1985, has remained high by past standards and would have been even higher had not price deregulation been delayed. This delay has benefited particularly the urban population, since urban inflation fell from around 12 per cent in 1985 to 7 per cent in 1986, while rural inflation fell around 7 per cent to 5 per cent.[21] Furthermore, money incomes increased faster in urban areas. These two factors accounted for the fast growth in private consumption demand, which has been one of the main problems confronting the Government.

In the external sector, the measures taken by the Government, following the deterioration in the trade balance, on account of the upsurge in imports, have contributed to reducing import growth to only 1.6 per cent in 1986. Exports in that year increased by 13.1 per cent, reducing the trade deficit in the balance of payments from $13.1 billion to around $10.0 billion. As there were no significant changes in the trade in services and in private transfers, the reduction of the payments deficit was limited and the deficit was financed almost entirely through inflows of capital, leaving exchange reserves unchanged.

In 1987, the need to control further demand growth will continue to dictate policy as has been envisaged by the plan. Growth is again expected to remain close to target rates, i.e. around 7.5 per cent, with emphasis given to the extension of the economic reform.

D. Developed market-economy countries

The expansion of economic activity in the developed market economies has slowed down irregularly over the last 18 months, bringing them dangerously close to the edge of recession. Despite low inflation, declining interest rates and a recovery in business profitability, output expanded very moderately in 1986. There was a slow-down towards the end of the year in major countries, with no clear sign of reversal in the first few months of 1987. Both the underutilization of capacity and unemployment have been rising; and forecasts for the year have been successively scaled down.

Current trends contrast sharply with earlier expectations of robust growth, stimulated in particular by the sharp drop in the price of oil toward the end of 1985. The optimistic assessments of growth prospects were based on the perception that lower energy prices would afford an opportunity for the developed market economies to exploit the existing spare capacities in their economies without incurring additional inflationary risks. Indeed, at the onset of the oil price decline, the developed market-economy countries had been growing at a rate considerably below their potential. The common expectations in early 1986 were thus for faster real growth accompanied by reduced inflation in most countries. In fact, most observers raised their growth forecasts for these countries, sometimes by as much as three-quarters of a percentage point, in the early months of 1986.

There have been several forces at work which have both disappointed these expectations and caused the developed market economies to drift towards recession. For one thing, the direct effects of the oil price decline on real expenditure have proved to be comparatively modest. But there have also been strikingly large offsetting changes in demand. Most important has been the decline in exports to the developing countries brought about by the fall in oil prices as well as by the weakness of other primary commodity prices and the burden of servicing external debt. Macroeconomic policies, moreover, have not been actively used to compensate for the unexpectedly lower levels of real expenditure; though monetary policy has generally eased, fiscal policy has been neutral or restrictive. A further factor exerting increasing influence in recent months has been the deflationary effects of the recent realignment of the exchange rates of the three largest trading countries. Though a necessary step in

[21] The price of foodstuffs went up by 7.4 per cent in 1986, as compared to 14.4 per cent in 1985 ("Communiqué on the Statistics of 1986 Economic and Social Development", *Beijing Review*, No. 9, p. 24).

correction of the huge trade imbalances, the large devaluation of the dollar has imparted considerable downward pressure on output and investment in Japan and Western Europe without, as yet, stimulating economic activity in the United States or elsewhere. These forces, acting partly in succession and partly in combination, are currently causing levels of real expenditure on consumption and investment to stagnate and even decline.

1. The oil price decline and its impact on domestic price formation and related activities

After having risen dramatically during the mid- and late-1970s, the price of crude oil traded internationally began to drop gradually in 1981 as world imports and consumption fell. It has been estimated that, despite a 3 per cent average annual growth rate of GDP in developed market-economy countries between 1982 and 1985, oil consumption declined slightly during the same period as a consequence of conservation and substitution from alternative energy sources. Additional supplies were also forthcoming from non-OPEC sources in the face of sluggish economic growth in most consuming countries. A precipitate drop in oil prices took place toward the end of 1985; at their lowest point spot oil prices averaged $10 a barrel, a sharp drop from the high of over $36 obtaining in 1981.

Reflecting both the weakness of prices and the much-reduced demand, aggregate oil revenues of the countries members of OPEC have been falling since the 1980 peak of $282.3 billion, amounting by 1985 to only $131.5 billion.[22] The collapse of oil prices in late 1985 may have reduced the revenues from oil exports of these countries to well below $100 billion in 1986. An immediate consequence of the large reduction in earnings from oil has been the added pressure on member countries to cut back further their expenditures, especially on their imports of manufactures from the developed market-economy countries. Apart from the OPEC member countries, other developing countries exporters of oil, such as Egypt, Malaysia and Mexico, also suffered from lower export earnings.

From the net oil-importing countries' point of view, the recent sharp drop in oil prices represented significant reductions in their oil import bill. In other words, there was a transfer of income to these countries from the exporters of oil. The extent of this transfer is reflected in the size of the improvement in the terms of trade of the net oil-importing countries accountable for by the drop in oil prices. Measured against the net importers' GDP, the terms-of-trade gains varied quite widely among the major OECD countries in 1986, reflecting in the main the differences in the shares of net oil imports in relation to total output. Thus, the gains in Italy amounted to as much as 1.7 per cent of GDP, while they were somewhat less in the other major countries: 1.4 per cent in the Federal Republic of Germany, 1.2 per cent in France, and 1.1 per cent in Japan.[23] In spite of the large absolute value of oil imports into the United States, the terms-of-trade gains were estimated to have been only half a percentage point of GNP. As a consequence, that country could not be expected to reap large savings from the price declines, and the potential impact of the gains were consequently relatively smaller than for other countries.[24] On the other hand, being net oil exporters, the United Kingdom and Canada, among the major developed market-economy countries, were expected to incur terms-of-trade losses amounting in each case to somewhat less than 1 per cent of GDP. For the developed market-economy countries taken together, the net gains amounted to close to $60 billion, or about 0.7 per cent of their combined 1985 GDP.

It was generally expected that the substantial improvement in the terms of trade of the net oil-importing countries would provide a definite stimulus to domestic activity in these countries. First, the reduction in oil prices would act to increase the purchasing power of consumers, thus encouraging them to raise their spending. Second, since oil is a production input, its decline in price would result in lower costs to firms, thereby raising their profit margins and stimulating their investment. Accordingly, the extent of the actual impact of the recent oil price declines on economic activity in the net oil-importing countries has been influenced both by the distribution of the terms-of-trade gains between governments,

22 See OPEC *Statistical Bulletin*, 1985, p. 6.

23 While it is clear that oil prices have dropped sharply since the fourth quarter of 1985, it is difficult to have a reliable estimate of the average price of oil, since spot prices can be quite unrepresentative and could differ substantially from transaction prices. For the discussion in this paragraph use is made of the estimated unit value of energy imports into individual countries.

24 For the adverse impact of the decline in oil prices on United States energy producing sectors, see para. 85.

producers and consumers and by their reactions to the windfall gains.

In order for the terms-of-trade gains to reach the consumers, associated reductions in consumer prices have to take place. Clearly, the direct effect of oil price declines on domestic prices is reinforced if corresponding movements are forthcoming from domestically produced energy products. On the other hand, the actual pass-through to final consumer prices of the lower oil bills is much reduced if energy taxes are increased or the gains through lower costs are retained by firms as profits. In fact, in most countries, part of the recent terms-of-trade gains has accrued to governments as revenues, or has contributed to raising business' profit margins. Some countries in Western Europe[25] actually responded to the oil price decline by raising oil-consumption taxes, in some cases with a view to reducing government deficits. In any event, because of taxes - whether raised or unchanged - changes in final sales prices including taxes were relatively more subdued than changes in prices before tax. The data in table 6 indicate the changes in petrol prices both including and excluding taxes in the major developed market-economy countries in 1986. The most striking case is that of Italy where, for example, post-tax prices fell hardly at all in 1986. Excluding taxes, prices would have been lower by over 40 per cent in the same year. Although after-tax prices fell more in the other major OECD countries (over 20 per cent in both the United States and the Federal Republic of Germany), pre-tax prices recorded even more pronounced drops.

Since the decline in oil import prices was so large, it contributed significantly to reducing inflationary pressures in many of the net oil-importing countries by affecting both wholesale prices and final consumer prices, oil being both a production input and a final consumption good. As can also be seen from table 6, the fuel and electricity component of the consumer price index has declined substantially in the major European countries, with the exception of the United Kingdom. The decline was modest in the United States and very small in Japan.[26] An idea of the contribution of the large drop in oil prices in reducing the cost of living can be seen from the behaviour of the consumption price index excluding the energy (fuel and electricity) component. This index also showed marked deceleration in all cases, although less than for the energy component (see table 7).

Apart from contributing directly to lowering the prices of oil and related products, the reduced oil import costs could also be expected to have secondary disinflationary repercussions throughout the rest of the economy. To gain some insight into this contribution, two comparisons are made. The first is between the rate of change in the consumer price index, which comprises domestic as well as foreign input components, and that of the GDP deflator (which is a measure of the price of the domestic production inputs only). The second is actual inflation rates compared with those that could be expected, *a priori*, from the reduced oil costs. As can be seen from table 7, the divergence in the rates of increase of the consumer price index and those of the GDP deflator was pronounced. In particular, while the GDP deflator in the Federal Republic of Germany rose by 3 per cent in 1986, the consumer-price index actually fell. The discrepancies were also large in the other major countries (close to 2 per cent in Japan and France, somewhat less than 1 per cent in the United States). The difference was, however, negligible in the United Kingdom, which also recorded the only instance of an increase in the energy consumer price index in 1986. Furthermore, *a priori*, the deceleration in the inflation rates in the developed market-economy countries could be expected to have been more significant than it actually was (see Box 1). Thus, assuming no changes in energy taxes, simulations show that for most developed market-economy countries, the direct impact of the recent drop in oil prices would have been to reduce the private consumption deflator in these countries by over 1 percentage point on average. The actual outcome, however, fell somewhat short of these expectations (see table 8 and Box 1). Nevertheless, the actual slowdown in inflation in the developed market-economy countries was quite significant in 1986. For all these countries taken together, the rate of change in the private consumption deflator dropped from 4.5 per cent in 1985 to only 2.8 per cent in 1986. It should also be noted that the very moderate increase in labour costs and the continued weakness of non-oil commodity prices also contributed to easing inflationary pressures in these countries.[27]

25 Denmark, Greece, Ireland, Italy, Portugal and Spain.

26 The windfall profits to the energy industries in Japan that arose from the oil price declines were to be refunded to users after June 1986. These refunds were expected to amount to 0.3 per cent of domestic demand. Of the total refunds, 70 per cent was destined for the industrial sector and 30 per cent for households. In other words, the immediate effect on consumer prices would be rather small.

27 It is estimated that hourly earnings in manufacturing in the OECD countries increased by about 4.5 per cent in 1986, i.e. half a percentage point less than in 1985. For details on primary market developments in 1986 see paras. 530-535.

Table 6

IMPORT AND DOMESTIC PRICES OF CRUDE OIL AND ENERGY PRODUCTS IN 1986 [a]

(Average percentage change from 1985)

Country	Import prices of crude oil	Energy component of the CPI [b]	Petrol prices [c] (A)	(B)
France	-48.4	-12.7	-15.6	-41.7
Germany, Federal Republic of	-60.5	-12.7	-25.3	-43.8
Italy	-59.0	-6.7	-3.1	-40.6
Japan	-59.5	-0.9	-12.1	-19.8
United Kingdom	-54.4	1.4	-13.9	-33.0
United States	-44.7	-2.3	-22.5	-29.6

Source: OECD, *Main Economic Indicators*, various issues; IEA, *Energy Prices and Taxes*, fourth quarter 1986.
a Expressed in terms of domestic currencies.
b Fuel and electricity component of the consumer price index.
c A: Including taxes; B: excluding taxes.

In spite of the deceleration in inflation during recent months, not all the reductions in costs have been passed on to consumers. There has been a continued improvement in profit margins of firms.[28] Other evidence also points to the continued shift in the share of income away from labour income in recent months; for instance, an examination of the relative movements of real wages and labour productivity shows that the former has been rising more slowly than the latter, especially in Western Europe.[29]

On the negative side, lower oil prices had a direct adverse effect on domestic activity through their impact on the private oil sector, in particular through a reduced cash flow and earnings, thereby leading to capital expenditure cutbacks in the oil-producing sector. For example, net income as reported by 15 leading oil companies in the United States dropped by as much as 25 per cent in 1986 and major companies, in anticipation of the reduced earnings, announced early in 1986 cuts of 20-50 per cent in their 1986 capital budgets.[30] Altogether, plant and equipment expenditures in the mining sector in the United States are estimated to have dropped by over 32 per cent in real terms in 1986 as compared with the reduction of about 6 per cent in the preceding year.[31] Thus, to counteract the adverse impact of lower oil prices on domestic exploration and production, as well as to clean the environment, proposals were made in the United States to impose an oil tax on both domestic and imported oil.[32] Lower oil prices also contributed to reducing significantly government revenues in countries with an important oil sector.[33]

In short, though the oil price decline generated large terms-of-trade gains for the developed market economies - equivalent to no

28 Lower oil prices also led to substantial inventory valuation losses.

29 See, *European Economy*, Supplement A, No. 10, October 1986, p. 7.

30 *Petroleum Economist*, April 1986 and March 1987.

31 *Survey of Current Business*, December 1986.

32 In September 1986, the United States Congress adopted legislation to impose a tax of 8.2 US cents barrel on domestic oil and 11.7 US cents barrel on imported oil and its derivatives.

33 Government oil revenues in the United Kingdom declined from £11.5 billion in 1985 86 to £6 billion in 1986 87. Lower prices also seemed to have contributed to the weakness of the pound during 1986. Nevertheless, while oil prices had recovered toward the middle of the year, the pound continued its decline in the subsequent period.

Table 7

SELECTED DEVELOPED MARKET-ECONOMY COUNTRIES: SELECTED PRICE INDICES IN 1985 AND 1986

(Percentage change from previous year)

Country	Consumer price index			GDP deflator
	Total	Energy [a]	Other	
France				
1985	5.8	8.2	5.5	5.8
1986	2.7	-12.7	4.4	5.0
Germany, Federal Republic of				
1985	2.2	3.6	2.1	2.2
1986	-0.3	-12.7	0.8	3.0
United Kingdom				
1985	6.1	4.3	6.2	5.8
1986	3.4	1.4	3.5	3.5
Japan				
1985	2.1	-4.5	2.4	1.7
1986	0.4	-0.9	0.5	2.3
United States				
1985	3.5	1.7	3.7	3.4
1986	2.0	-2.3	2.3	2.8

Source: OECD, *Main Economic Indicators*, various issues, and *OECD Economic Outlook*, No. 40, Dec. 1986.
a Fuel and electricity.

less than 0.7 per cent of their GNP - its stimulating effect on real expenditure and output has proved to be much less than expected. Much of the gain was captured by profits or taxes or failed to stimulate demand. In addition, the oil sector in oil-producing countries was depressed, which exerted a drag on domestic demand.

The other side of the coin was that the loss in export earnings sustained by the oil-exporting developing countries, together with the weakening in non-oil primary commodity prices, substantially reduced demand for the exports of the developed market economies. The consequential deflationary effect on domestic demand in OECD countries may well have exceeded 0.5 per cent of GNP in 1986. Thus, while the oil price decline further reduced price inflation in those countries and boosted profits in 1986, it has not proved enough to prevent a deceleration in the pace of economic activity.

2. *Foreign trade*

The improvement in the terms of trade of the developed market-economy countries was so large that the combined trade deficit of these countries fell markedly in 1986, in spite of the unfavourable trends in the volume of trade. Their combined volume of exports expanded by only 1.7 per cent in 1986, whereas that of imports grew by as much as 7.7 per cent (see table 2). From $104 billion[34] in 1985 the deficit fell to $76 billion in 1986, an improvement of $28 billion. The improvement in the terms of trade is estimated to have been close to 10 per cent during this period. *Vis-à-vis* the developing countries, the improvement was much larger because of the sharp drop in the

34 Imports valued c.i.f. and exports f.o.b., in current dollars.

Table 8

DEVELOPED MARKET-ECONOMY COUNTRIES: PRIVATE CONSUMPTION DEFLATORS IN 1986

(Percentage change from 1985)

Country/region	Actual (1)	Simulated (2)	(3)	Shortfall (4) = (2)-(1)
North America	2.4	2.1	-1.1	-0.3
EEC	3.0	2.6	-1.1	-0.4
Japan	0.8	0.2	-0.7	-0.6

Source: University of Pennsylvania, *Project LINK World Outlook - Alternative Scenarios*, Philadelphia, March 1986. The simulation was carried out with a 45 per cent decline in oil prices (*OECD Economic Outlook*, No. 40, Dec. 1986).

Note: (1) Actual rate of change; (2) simulated rate of change; (3) simulated contribution of lower oil prices.

price of oil and the continued weakness of most other primary commodities exported by the developing countries.

(a) Exports to developing countries

As was anticipated in *Trade and Development Report 1986*, the decline in the volume of developed market-economy countries' exports to the oil-exporting developing countries accelerated markedly from 1985 to 1986. Imports from this source into most other developing countries also declined in these two years, though less markedly. This was mainly because of the further weakening in prices of primary commodities relative to prices of manufactures exported by developed market-economy countries: the terms of trade of primary (non-oil) commodities stood in 1986 at only two-thirds of their level in 1980. The servicing of outstanding debt subtracted further from the available foreign exchange for imports. Indeed, except for a pause in 1984, developed market-economy countries' exports to developing countries have been declining steadily in real terms since the onset of the debt crisis in the early 1980s. The rate of decline of these exports averaged around 3 per cent during 1982-1985 but accelerated to about 10 per cent during the first three quarters of 1986 owing to a very sharp drop in exports to the oil-exporting developing countries. The cutbacks in import demand in developing countries amounted to around 0.3 per cent of the combined GDP of developed market-economy countries in 1986. If account is taken of secondary repercussions on domestic activity, the reduction in demand from the developing countries must have exerted a negative impact easily exceeding 0.5 per cent of the combined GDP of developed market-economy countries.

As can be seen from table 9, exports from EEC to developing countries fell absolutely in 1986; EEC-countries' overall export activity was supported mainly by intra-Community trade during the year. With very few exceptions, falling export volumes to the developing regions were observed for the other major developed market-economy countries as well. The rates of decline, moreover, were particularly marked in the case of exports to the oil-exporting countries and represented substantial deteriorations from the 1985 rates.

(b) The major trade imbalances

The huge trade imbalances in the world economy now constitute a major threat to global economic activity. The trade deficit of the United States, valued in current dollars, has continued to increase. While the largest counterpart surpluses have remained those of the Federal Republic of Germany and Japan, a significant feature of 1986 was the large surpluses accumulated by developing countries in East Asia which are exporters of manufactures.

There are three sets of reasons for deep concern about the trade balances. Two stem

Box 1

PASS-THROUGH OF OIL PRICE CHANGES

Past experience reveals that both the speed and the extent of the pass-through of the changes in oil import prices have varied widely over the years. For example, during 1978-1980 the impact of higher imported oil prices on final energy prices was more substantial and more rapid than during 1973-1975. It was estimated that a 10 per cent rise in oil prices would raise the energy component of the wholesale and consumer prices by 6 and 4 per cent, respectively. In contrast, during 1973-1975, a 10 per cent increase in oil import prices boosted final energy prices by less than 3 per cent. [1] Available statistics tend to show that the large oil price declines in 1986 have been passed on to the final users only very partially. A comparison between the rates of change in the import price of energy products and those in the energy component of the consumer price index shows that the observed declines in the latter were considerably more subdued than in the former. Furthermore, a large positive increase in the energy consumer price index occurred even where energy import prices showed considerable decline during 1986 (see table 6). [2]

1 See, OECD, *Economic Outlook*, December 1980, table 27.

2 In some cases, the pass-through operated with considerable time lags because of institutional factors. For example, in Japan, the requirement to maintain oil stocks implies a lag between import prices and prices paid by users as oil is sold at the average cost of stocked oil instead of "new" oil. See, *OECD Economic Surveys 1986/1987, Japan* (Paris, OECD, November 1986).

from the slow pace at which adjustment of the United States trade balance to the depreciation of the dollar has been taking place, and the third derives from asymmetries in the mechanism of adjustment itself. The slow pace has meant that the leakage of domestic demand into imports has remained high while export industries have not yet recovered strongly from their past losses; this has delayed the stimulus to the United States economy that should come from rising net exports and has fanned protectionist sentiments and international trade conflicts. The slow pace has also greatly accentuated concerns about when the deterioration in the United States current-account deficit would be halted, provoking further depreciation of the dollar, a sharp contraction of private capital inflows and a fear that the United States will have to raise interest rates in order to restore these flows. But in the present circumstances of weakening domestic activity, this could tilt the economy further towards recession. The third dangerous element in the situation is rooted in the asymmetries that exist in the adjustment process itself. Because the foreign trade sector bulks much larger in the economies of the Federal Republic of Germany and Japan than it does in the United States, a contraction in net exports of the former countries tends to have a larger deflationary effect on their aggregate demand than an equal and opposite improvement in the net exports of the United States has in expanding demand.

The actual evolution of events in recent months has been as follows. As a result of the appreciation of their exchange rates, both the Federal Republic of Germany and Japan have been experiencing a contraction in the volume of their exports relative to imports. In the case of Japan, the rise in import volume in 1986 was affected by substantial shipments of non-monetary gold, but imports of manufactured goods also rose markedly, although from a relatively small base. In the United States, trade volumes, especially import volumes, have not yet responded noticeably to the depreciation of the dollar in spite of the fact that in terms of the effective exchange rate the rise between 1980 and 1985 has been wiped out. It should be noted, however, that the rise in import volume in 1986 was boosted by the large shipments of oil into the country in response to the price declines. Available statistics showed that United States imports of crude oil rose by 1 million barrels per day (about 30 per cent) in 1986, the largest jump since the mid-1970s.[35]

In December 1986 the effective exchange rate of the dollar stood at more than 25 per cent below the peak level of the first quarter of 1985. The fall was most pronounced against the currencies of Japan and the Federal Re-

35 See *Petroleum Economist*, March 1987, p. 99.

Box 2

RESPONSES TO OIL PRICE CHANGES

Economic events since the oil price increases of the mid-1970s illustrate the diversity of responses and outcome against the backdrop of oil price shocks. For example, as a consequence of the oil price increases, the terms-of-trade losses incurred by Japan were about the same in 1974 and 1979. The adjustment of the Japanese economy during the second episode of price increases, however, was much smoother than during the first. Indeed, a very deep recession followed the 1973 price increase, but there was no significant deceleration in the growth of output in 1979. One reason for the dissimilar results could be found in the shift to monetary restraint which was adopted some time before the onset of the 1973 oil price increase in response to the existing high demand pressure at that time. Moreover, the execution of the initially planned public works was also postponed and subsequently slowed down. In contrast, the degree of restraint in both monetary and fiscal policy was relatively moderate in the second episode of oil price increases. In particular, government gross investment continued to rise in 1979, whereas it declined sharply in 1974. [1]

In contrast, the deterioration in the terms of trade of the Federal Republic of Germany was worse after the second oil price increase than after the first, because of the increased share of oil in total imports. Furthermore, the two large oil price increases occurred when the economy of the Federal Republic was at very different phases of the business cycle. In fact, the first oil price increase took place at the beginning of a recession, while the second coincided with an upswing. Thus, in sharp contrast to Japan, the tightening in policy, especially monetary policy, was much more severe in the Federal Republic of Germany during the second episode than during the first. [2] It has been observed that in the United States the decline of demand, brought about in part by contractionary policies, exacerbated the recessions in the mid- and late-1970s. Moreover, the initial demand decline in 1979-1980 was amplified by an "inventory-investment multiplier-accelerator". [3]

1 For an analysis of the macroeconomic policy response to the two oil price increases in Japan, see, for example, K. Shigehara, "Absorption of the two oil shocks", *European Economic Review*, No.18, 1982.
2 See, for example, *OECD Economic Outlook*, Vol. 40, December 1980, and H. Lehment, "Economic policy response to the oil shocks in Germany", *European Economic Review*, No. 18, 1982.
3 See, for example, J. Sachs, "The oil shocks and macroeconomic adjustment in the United States", *European Economic Review*, No.18, 1982.

public of Germany; it is relevant that there was little change against the currencies of countries in East Asia which are exporters of manufactures. Yet, given the large depreciation of the dollar, the changes in the terms of trade of the United States attributable to currency realignments appeared to have been very limited. One reason for this seems to be that the prices of merchandise imports into the United States have not, in some major cases, reflected fully the adjustment of the dollar *vis-à-vis* the currencies of its trading partners. For example, dollar prices of Japanese goods appear to have risen by much less than the revaluation of the yen. Evidence also suggests that, faced with reduced orders, Japanese firms were cutting the yen prices of their exports and in the process were cutting their profit margins to maintain their market shares. At the same time, importers in the United States seem to have been slow to pass on the benefits of the recent depreciation of the dollar. This situation contrasted sharply with the substantial cuts in prices in response to the earlier appreciation of the United States currency.[36] As can be seen from table 10, the nominal effective exchange rate of the dollar fell by more than 26 per cent from the first quarter of 1985 to the fourth quarter of 1986. And yet, the index of the average value of manufactured goods imported into the United States rose by only about 8.5 per cent during these eight quarters. It started to increase significantly only in the second quarter of 1986. For 1986 as a whole, it was only about 5 per cent higher than in 1985, compared with an effective devaluation of the dollar of over 18 per cent.

It is germane to note that the volume of United States imports has been growing at a record rate since 1980. Cumulatively, it increased by 45 per cent between 1980 and 1985.

36 See *OECD Economic Surveys 1986 1987, United States*, Paris: OECD, November 1986, p. 16.

Table 9

UNITED STATES, JAPAN AND EEC: EXPORTS TO DEVELOPING COUNTRIES IN 1985 AND 1986

(Percentage volume change over previous year)

	United States		*Japan*		*EEC*	
Country group	*1985*	*1986* [a]	*1985*	*1986* [a]	*1985*	*1986* [a]
Exports to all developing countries						
of which						
Africa	-15.5	-24.5	-26.3	-23.3	-6.7	-15.9
Latin America	3.7	0.9	-1.3	-7.2	-3.6	-1.6
West Asia	-19.4	-14.5	-11.2	-29.7	-16.8	-20.4
South and East Asia	-7.7	1.7	-8.0	1.7	4.3	-2.5
Memo items:						
Exports to major oil-exporting developing countries	-0.6	-10.5	-14.0	-24.3	-13.2	-19.8
Exports to world	-1.4	0.9	4.8	-0.6	4.6	1.2

Source: United Nations, *Monthly Bulletin of Statistics*, various issues; OECD, *Monthly Statistics of Foreign Trade*, March 1987. The percentages are derived from data in constant prices.

a First three quarters of each year.

On the other hand, the volume of exports recorded an absolute decline of some 15 per cent during the same period. In 1986, the growth in the volume of merchandise imports outstripped that of exports by about 10 percentage points (see table 11). However, there was evidence of some improvement in export performance during 1986, which appears in part to have been brought about by increases in international competitiveness of American firms following the devaluation of the dollar. However, the recent growth of United States exports has not been sufficiently fast to yield noticeable progress in improving the net export position. Net exports in constant prices on a seasonally adjusted basis, improved during the first and fourth quarters and deteriorated during the second and third. On balance, the deteriorations exceeded the improvements in absolute terms during the year. The gain in merchandise exports reflected a very good performance in agricultural trade, as United States exports of these products have benefited significantly from the implementation of the Food Security Act of 1985 concerning 1986 crops. As a consequence of this Act, the competitiveness of American agricultural exports was much enhanced by the falls in their export prices.[37] Very fast rates of growth of non-agricultural exports were also recorded during the second half of the year, and have thus lent support to the belief that some tangible effects of the dollar depreciation might be finally discernible. Merchandise imports into the United States, however, continued to grow at relatively high rates during 1986. Indeed, the slow-down during the fourth quarter reflected mainly the sharp drop in petroleum imports. Imports of non-petroleum products increased in that quarter at about the same rate as the average

37 For example, from April to October 1986, cotton prices fell by 37 per cent, rice by 33 per cent, wheat by 17 per cent and corn by 29 per cent. See *Survey of Current Business*, January 1987.

Table 10

UNITED STATES: MOVEMENTS IN THE NOMINAL EFFECTIVE EXCHANGE RATE AND UNIT VALUE OF MANUFACTURED GOODS IMPORTS, 1985-1986

A. Index (1980= 100)

	1985					1986				
Item	*Year*	*I*	*II*	*III*	*IV*	*Year*	*I*	*II*	*III*	*IV*
Nominal effective exchange rate	150.2	160.0	155.7	147.6	137.4	122.5	129.3	123.9	118.9	118.0
Manufactured goods imports: unit value	103	103	103	104	105	108	104	108	111	112

B. Percentage change

Item	*1986/1985*	*1986 IV/1985 I*	*1985 IV/1985 I*	*1986 IV/1986 I*
Nominal effective exchange rate	-18.4	-26.3	-14.1	-8.7
Manufactured goods imports: unit value	4.9	8.4	1.7	7.4

Source: IMF, *International Financial Statistics*, various issues; OECD, *Monthly Statistics of Foreign Trade*, various issues.

of the first three quarters, and in consequence real import levels have remained relatively high, in spite of both the increases in import prices and the slackening of domestic demand.

Because of the persistent trade deficit and its financing, the current-account deficit of the United States has been progressively worsened by the servicing of the growing foreign debt, estimated to have reached as much as $220 billion at the end of 1986.[38] Thus, the improvement required of the trade performance of the United States is enormous, both because of the accumulation of the foreign debt and because of the very large gap between exports and imports; imports exceeded exports by as much as 65 per cent in 1986. It follows that exports will have to expand 65 per cent faster than imports just to keep the trade deficit unchanged. To keep constant the gap between exports, on the one hand, and the sum of imports and interest payments on the other, exports would have to expand at a rate exceeding the growth in imports and interest payments by well in excess of 70 per cent.[39] Because of the large gap between exports and imports, the impact on the United States trade balance of a given increase in the rate of growth of GNP of other countries would be significantly smaller than that of an equal decrease in the growth rate of the United States.[40]

38 United States Department of Commerce estimate, as quoted in *International Herald Tribune*, 18 March 1987.

39 Interest payments have been calculated on the basis of the level of the 3-month United States Treasury Bill rate at the end of 1986.

40 Assuming roughly similar import and export income elasticities, the impact of growth on imports operates on the basis of an initial value 65 per cent higher than that of exports. Available evidence, furthermore, seems to indicate that United States elasticity of imports far exceeded its export elasticity. For a survey, see, for example, M. Goldstein and M.S. Khan "Income and price effects in foreign trade", in R.W. Jones and P.B. Kenen (eds), *Handbook of International Economics*, (North-Holland, Elsevier, 1985), vol. II.

Table 11

UNITED STATES: SEASONALLY ADJUSTED EXPORTS OF GOODS AND SERVICES IN 1986: ANNUAL OR QUARTERLY CHANGE IN VOLUME OVER CORRESPONDING PERIOD OF 1985

(Percentage change over corresponding period of 1985) [a]

Item	*Year*	*I*	*II*	*III*	*IV*
Exports	2.5	7.1	-9.8	13.3	16.1
Merchandise	4.4	7.6	-8.0	22.0	24.4
Agricultural	-1.6	-12.4	-39.9	69.3	53.6
Non-agricultural	5.4	11.2	-2.5	16.7	20.6
Services	-0.9	6.4	-12.8	-0.7	2.1
Imports	10.7	0.2	15.8	17.3	4.8
Merchandise	14.0	1.3	22.2	24.4	3.7
Petroleum	26.9	-43.8	166.0	92.5	-14.7
Non-petroleum	11.5	13.5	4.9	12.3	8.8
Services	-1.1	-4.2	-6.5	-8.9	9.7
Memo item:					
Net exports (in billions of 1982 dollars, at annual rates)	-149.7	-125.9	-153.9	-163.3	-155.6

Source: *Survey of Current Business*, January 1987.

a The percentage changes are derived from seasonally adjusted data on a national income and product basis, valued in 1982 dollars.

3. *Macroeconomic policy*

In general, the policy stances adopted in most developed market economies cannot be interpreted as stimulating aggregate demand in 1986. The fiscal stance was more or less neutral and monetary policy, having eased somewhat in the early months, became more cautious toward the latter part of the year. In the early months of 1987, monetary policy was eased in the surplus countries and tightened moderately in the United States.

The shift toward a more restrictive fiscal posture reflects action taken in the United States in passing the Balanced Budget and Emergency Deficit Control Act (also known as the Gramm-Rudman-Hollings Act) in December 1985 and the Tax Reform Act in October 1986. While the aim of the Balanced Budget Act was to eliminate the federal budget deficit by fiscal year (FY) 1991, the Act also established intermediate targets for the deficit in the intervening years. The target set for FY 1986 ($172 billion) was exceeded by the actual deficit ($221 billion) by a large margin. A significant reduction in the deficit was planned for FY 1987. The reduction, though not expected to be fully realized, represents a marked tightening of the fiscal stance.[41] The Tax Reform Act may adversely affect economic activity in the short run by reducing incentives to invest, especially in equipment by the corporate sector.[42]

Taken together the European OECD countries and Japan are expected to have rela-

41 According to OECD secretariat calculations, the planned reduction would imply an *ex ante* negative impulse of close to 1 per cent of GNP in 1987. See *OECD Economic Outlook*, No.40, December 1986.

42 See *OECD Economic Surveys 1986/1987, United States (op.cit.)*, annex 2.

tively stable budget balances. In particular, fiscal policy in the Federal Republic of Germany and Japan is expected to be less restrictive after a protracted period of restraint. In Japan, the Government announced, in September 1986, a new package of measures which the Economic Planning Agency estimated would add 1.5 per cent to domestic demand over the next year. The package consists in the main of additional public works expenditures by both central and local governments. It also includes additional funds for construction loans and aid for the industries affected by the yen's appreciation. However, the impact of the package on growth prospects remains in doubt since the private sector's response to the loan provisions is uncertain. The Japanese Government also adopted, in late May 1987, a reflationary economic package of public spending increases and tax cuts amounting to Y6000 (about 2 per cent of GDP). Over 90 per cent of the funds earmarked for public works is to be spent in the fiscal year ending March 1988. In the Federal Republic of Germany, the extent of public deficit reductions obtained so far allowed for the possibility of income tax cuts in early 1986 and 1988, without much danger to the success of consolidation. There were also indications that the Government was intending to introduce tax reforms with consequent net reductions in revenues of DM 20 billion and was prepared to re-examine the country's fiscal stance if the economy slowed down considerably in 1987, as it currently show signs of doing.

Judging from interest rate movements, monetary conditions appear to have eased in some major developed market-economy countries during 1986. In the United States, the relaxation of monetary policy had started in early 1986 with successive cuts in the discount rate in response to the weakening of economic activity and declines in other interest rates, both short-term and long-term. By October 1986, short-term interest rates averaged 5.18 per cent, and long-term rates just over 8 per cent, which was much lower than their respective levels toward the end of 1985 (over 7 per cent and 10 per cent, respectively). However, whereas long-term rates continued to decline, short-term rates increased somewhat toward the end of the year. In the early months of 1987, both have been rising. In Japan, monetary policy stance also eased in the course of 1986 in response not only to the sluggishness of economic activity in that country, but also to the upward pressures on the yen. The discount rate was reduced to a record low of 3 per cent during the year, down from the level of 5 per cent which had existed since 1983; and it was lowered again to 2.5 per cent in early 1987. In contrast, the discount rate in the Federal Republic of Germany has stayed unchanged at 3.5 per cent since the reduction by half a percentage point in the early months of 1986, and three-month money market rates remained stable. In early 1987, the discount rate was lowered. The money supply also continued - as in 1986 - to overshoot its target range. Interest rates also declined significantly in the other major Western European countries in 1986, except in the United Kingdom where they came under upward pressure because of the accelerated fall of the exchange rate during the year.

Despite the drops in nominal rates, real long-term interest rates remained high in most developed market-economy countries in 1986, particularly in the United States and Japan.[43] While the measurement of the movements in the real interest rates presents difficult conceptual problems, most available calculations show that real interest rates fell in 1986 in almost all the major developed market-economy countries except the Federal Republic of Germany. In particular, real short-term rates in many cases have dropped close to their average levels in the 1960s.

4. *Output and demand*

The oil price decline, the weakness in developing country import demand, the changes in exchange rates and the moderate changes in macroeconomic policies have been the major forces influencing recent or current trends in output and demand in the developed market economies. While overlapping considerably, their effects have varied in their timing. The consequence for total output has been not only that it has increased slowly but also that its pace of advance has been irregular and decelerated in the major countries toward the end of 1986 and in the early months of 1987.

Growth of real GDP was particularly weak during the first half of 1986, when domestic demand expansion, at around a 3.3 per cent annual rate, exceeded output growth by more than 1 per cent for developed market-economy countries as a whole. This reflected, in particular, much-reduced exports to the developing countries. The leakage through net

43 See *OECD Economic Outlook*, No. 40, December 1986, p. 9.

exports, however, was somewhat less during the second half of 1986.[44] Domestic demand continued to support economic activity during the second half of the year, an acceleration in Europe offsetting some weakening in Japan and the United States, but the overall resumption of growth was at a very modest pace. For 1986 as a whole, the rate of increase in GDP averaged only 2.4 per cent, even lower than the sluggish rate of 2.8 per cent recorded a year earlier. Toward year-end, however, and in the first quarter of 1987, signs of weakness were evident in some major countries as the deflationary effects of exchange rate appreciation worked through their economies.

Real growth of GDP in the developed market-economy countries in 1986 was thus much slower than in both 1984 and 1985, and considerably below the estimated 3 per cent growth of potential output. Most economies continued to operate with considerable slack. The growth performance of the major countries was thus uniformly poor in 1986, with individual growth rates clustering more closely around a very low overall average on account of slower growth in the United States and, more especially, Japan.

Responding to weak prices of commodity imports, especially oil, increases in real incomes contributed substantially to the growth of private consumption in many developed market-economy countries in 1986 (see table 12). Moreover, interest rate reductions in early 1986 also contributed to strengthening consumer demand in the course of the year. Thus, private consumption played a major role in supporting domestic aggregate demand in the developed market economies for the fourth consecutive year. This stands in sharp contrast to the performance of business fixed investment, whose contribution to economic growth significantly diminished during 1986.

Private consumption, the major contributor to real growth of GDP in Western Europe in 1986, is estimated to have expanded at about the average rate of the 1970s, considerably higher than the sluggish rate observed during the first part of the 1980s. In the United States as well, robust personal consumption growth was instrumental in supporting GNP growth during 1986. Indeed, personal consumption has been the main dynamic component of GNP in the United States since the onset of the recovery of economic activity in 1983.[45] Fuelled by increases in real incomes, consumer spending also registered relatively fast growth in Japan in 1986. Unlike the oil price decline, the revaluation of the yen was both reflected in lower import prices, and passed through to final demand. During the second half of 1986, consumer prices dropped to below the average level of the fourth quarter of 1985. It has also been estimated that, while the contribution of real incomes to personal consumption has lessened since early 1986, stable prices have contributed to raise the propensity to consume since late 1985.[46]

Some slackening of consumer demand, however, became evident in several countries toward the end of 1986. In the United States, seasonally adjusted personal consumption was estimated to have actually fallen at an annual rate of 0.4 per cent during the fourth quarter of 1986;[47] and a further fall took place in the first quarter of 1987. A decline in this major component, accounting for about two-thirds of aggregate demand, has been a relatively rare occurrence in the United States during the recent past. Indeed, the last absolute drop occurred during the fourth quarter of 1981 and signalled the fall in real GNP in the following year. In Japan as well, consumer spending is estimated to have been 0.7 per cent lower in the fourth quarter of 1986 than in the previous quarter (the first decline to have been recorded during the last 12 years), while the deteriorating net export position continued to weaken economic activity. Economic activity also weakened in the Federal Republic of Germany, where the growth of real GDP came to a complete halt in the final months of 1986.

In contrast to the relatively robust expansion of real private consumption, investment has turned out to be much less buoyant than expected. In Japan, the expectation of continued falls in demand from abroad has been a key determinant of weak fixed capital formation by business while in the United States cutbacks in investment in the energy

44 The decline in net exports during 1986 subtracted about 1 per cent or more from the growth of real output of the developed market economies as a group.

45 Much of this growth in personal consumption in 1986 was based on expanded consumer credit and a reduction in the savings ratio, rather than on real income growth. The savings ratio is estimated to have sunk to less than 3 per cent during the second half of 1986 at the same time as consumer debt was expanding rapidly. For further details on the expansion of household and business debt, see annex 4.

46 See Nomura Research Institute, *Quarterly Economic Review*, February 1986.

47 The decline in the fourth quarter came after the acceleration in personal consumption expenditures during the preceding quarter on account of the impact of the sales incentive programme offered by automobile manufacturers in response to an inventory build-up.

Table 12

UNITED STATES, EEC AND JAPAN: COMPONENTS OF FINAL DEMAND IN 1986

Item	*United States*	*EEC*	*Japan*
	A. Percentage change from 1985		
Private final consumption expenditure	4.0	3.6	2.7
Government final consumption expenditure	3.7	2.2	6.6
Residential buildings and construction	9.4	2.3	9.0
Other private investment	-1.4	6.1	6.6
Exports of goods and services	2.5	1.4	-4.6
Imports of goods and services	10.7	5.4	3.5
	B. Contribution to GDP growth (percentage points)		
Private final consumption expenditure	2.6	2.2	1.7
Government final consumption expenditure	0.8	0.4	0.6
Gross fixed capital formation	0.3	0.7	2.0
Exports of goods and services	0.3	0.5	-0.9
Imports of goods and services	-1.4	-1.6	-0.5
Stockbuilding	0.1	0.3 [a]	-0.3

Source: Commission of the European Communities, *European Economy*, various issues; OECD, *Quarterly National Accounts*, various issues, and *OECD Economic Outlook*, No. 40, December 1986.

a Statistical discrepancy.

sector have not been offset by faster capital spending in the rest of the economy. Very illustrative of the weakness of investment in the United States was the relatively small rise in this activity toward the end of 1986. It was generally expected that the withdrawal of certain tax breaks on corporate investment at the beginning of 1987 would generate a surge in investment before the end of 1986, but recent estimates of real plant and equipment expenditures point to a decline of 2.6 per cent in 1986, a marked deterioration from the rates of 15.8 per cent in 1984 and 8.7 per cent in 1985. The deterioration in 1986 reflected a 6.8 per cent decline in spending by manufacturing industries and almost no change in spending by the non-manufacturing sector. The data for the latter, however, conceal an increase of almost 6 per cent by the commercial and other sectors and a decline of as much as 32 per cent by the

mining sector.[48] In Western Europe, investment in equipment rose by about 6 per cent in 1986, a drop from 8 per cent in 1985. Although relatively fast, the 1986 rate fell far short of the original plans made in the spring of 1986. Capital spending in the manufacturing sector in the United Kingdom even declined absolutely during parts of 1986 and on average fell short of expenditures planned at the beginning of the year. One reason for the weakness in business fixed investment during the past year seems to be the less than bright economic prospects and growing slack in the use of existing capacity, especially in the metal-working industry, but because of the favourable consumer climate, investment in consumer goods industries was relatively more buoyant.

The pattern of private capital formation in Japan reflected the emerging dual development within the industrial sector in that country. Indeed, a stagnating manufacturing sector existed side-by-side with a buoyant non-manufacturing sector. Robust household demand stimulated retail sales and the output of the construction industry and services in general. Sluggish export performance, on the other hand, adversely affected activity in the manufacturing sector. For the industrial sector as a whole, fixed investment by firms turned out to be very subdued in 1986. Moreover, according to a recent survey by the Ministry of International Trade and Industry (MITI), almost all manufacturing industries are expected to be faced with excess capacity in the months to come. The reduced sales of export-oriented manufacturing firms have forced them to cut back significantly their inventories and the lower earnings from exports also induced reductions in expenditures on plant and equipment.[49]

In most countries the rate of growth of domestic absorption exceeded significantly that of real output and in many cases much of the increase in consumption was concentrated on services. As a consequence, industrial production in many countries hardly rose during the year. For the developed market-economy countries taken together, industrial production in 1986 was only 1.4 percentage points higher than in the preceding year. Industrial activity rose by less than 1 per cent in North America and only somewhat more than 2 per cent in Western Europe. It even declined slightly in Japan. Furthermore, from recent trends in industrial production growth, it is hard to detect any strengthening in industrial production in these countries. In the United States, total industrial production has been quite flat since the fourth quarter of 1985 and manufacturing production rose only slightly toward the end of 1986. In Western Europe, industrial production actually declined in December 1986 and stood at about the same level as in the second quarter of that year. And despite the substantial recovery in December from the low level of a month earlier, Japanese industrial production at the end of the year was no higher than at its start.

5. *Employment*

In spite of a relatively fast rate of employment growth, the unemployment situation remained more or less unchanged in the developed market-economy countries in 1986, because of an acceleration in the rate of growth of the labour force during the year. As a consequence, an estimated 31 million persons, representing somewhat more than 8 per cent of the labour force, were out of work in 1986. Altogether, the unemployment problem has not changed in any significant way during the recent past. However, the overall picture conceals a diversity of performance among countries in 1986. In particular, the employment growth in the United States was relatively rapid and reflected in the main the fast expansion of employment in the service sector. Goods-producing employment in general, and manufacturing employment in particular, has been more sluggish.[50] Employment in Western Europe continued to grow by no more than half a percentage point for the third consecutive year. As a consequence, the unemployment rate rose slightly during 1986, and at 11 per cent was about 4 percentage points higher than in the United States. While the unemployment rate in Japan, at 2.6 per cent, was the lowest among the developed market-economy countries, the employment situation worsened

48 These data on plant and equipment expenditures differ from those on non-residential fixed investment, which is a component of GNP, especially in type of detail, data sources, coverage and timing. See *Survey of Current Business*, February 1985 and December 1986.

49 According to the *Quarterly Corporate Statistics* of the Ministry of Finance, operating profits of manufacturing firms during the first half of 1986 declined by about one-third. Reflecting the buoyancy of domestic demand, however, operating profits in the non-manufacturing sector increased by more than 11 per cent during the same period. All in all, profits of the industrial sector as a whole dropped by about 9 per cent.

50 There was an estimated loss of 130,000 jobs because of layoffs in the oil and gas extraction industry in the first eight months of 1986. See *OECD Economic Surveys 1986 1987, United States, (op.cit.)*, p. 16.

in that country in the course of 1986. This was evidenced, for example, by the declining ratios of both job offers to applicants and new job offers to applicants. Furthermore, overtime work in the manufacturing sector also dropped sharply, and in the third quarter of 1986 stood 8.6 per cent lower than a year earlier.

6. *Prospects*

A substantial reduction in the United States' federal budget deficit is under way during the current fiscal year. The contractionary impact of this reduction needs to be counterbalanced by expansionary action elsewhere if the drift toward lower real growth and even recession in the developed market-economy countries is to be halted and eventually reversed.

The need for stimulative economic decisions outside the United States is all the more urgent because of the deflationary impact of the recent currency realignments. Indeed, the large currency realignments which have taken place in recent months, involving in particular the dollar and the currencies of the two largest surplus countries, (Japan and the Federal Republic of Germany), have imparted considerable downward pressure on economic activity in the latter two countries without, at the same time, yielding tangible positive results in terms of real growth in the United States. This is evident from the general weakness in the trends of most economic indicators in these countries in recent months. At best, only very moderate growth can be expected in the developed market-economy countries during the coming months. A major factor accounting for this expectation is, of course, the prospect of a slightly restrictive fiscal policy for the developed market economies. While the fiscal deficit in the United States can be expected to be much reduced in 1987, in the other major OECD countries the change in the structural budget balance is expected to be neutral. A more positive factor in the short-term outlook is the fall in both short- and long-term interest rates, at least in Western Europe and Japan. As was seen in the previous section, real rates have been on the decline in most countries, though they remain high by historical standards. The declining dollar and contraction in private capital inflows, however, have recently been putting upward pressure on United States rates.

Movement in the latest economic indicators in the developed market-economy countries has been on the whole very sluggish. In the United States, the growth rate of GNP slowed down to an annual rate of only 1.8 per cent during the fourth quarter of 1986 in response to a slackening of consumer spending. There was a sharp rise in the first quarter of 1987 to an annual rate of 4.3 per cent, mainly because of inventory accumulation and an improvement in the real trade balance. But personal consumption expenditure declined for the second consecutive quarter, and both residential and non-residential investment fell. Expected capital outlays are, furthermore, not promising. According to an estimate by the Department of Commerce, business was planning to increase capital expenditures by a mere 1.8 per cent in 1987. A very sluggish performance appears also in prospect for many Western European countries. In particular, in the Federal Republic of Germany, the economy contracted again in the first quarter of 1987 and the country's five leading economic research institutes have recently scaled down their forecasts and warned of a sharp slowdown in GDP growth for 1987. As a whole, a downward revision of growth forecast was also made in France, where activity has been stagnant during 1986. However, as better prospects for new orders and employment were spreading in the United Kingdom, reflecting past currency depreciation and a move toward easier monetary policy, output growth in the country appears to be accelerating in the present year. Very weak growth, however, may also be in store for Japan, where private consumption can be expected to slacken considerably because of low real income growth on account of the low bonuses and wage increases and the expected worsening of unemployment. To this should also be added the continued negative impact of the strong yen on export performance, which may lead to further cutbacks in capital expenditures, even though some recovery in business inventory investment can be forthcoming. In any event, the prospects for the pace of economic activity in the developed market-economy countries must be viewed against the background of the prolonged weakness of demand for their exports in the developing countries. It seems certain that, with unchanged policies, the slump in import demand in the latter countries will continue to exert a very marked downward drag on output growth in the developed market economies in the near future.

E. Socialist countries of Eastern Europe

Steady industrial growth, accompanied by a recovery in agricultural production, was the key factor of the good economic performance of socialist countries of Eastern Europe in 1986, consolidating the achievements of 1983-1985. Although performances varied among countries, 1986, with a 4.3 per cent aggregate growth of NMP can be considered as the most successful year for the region as a whole since the beginning of the 1980s.

The USSR made a major contribution to that overall growth performance; NMP in that country, which rose 3.5 per cent in 1985, grew by 4.1 per cent in 1986 (against a planned 3.9 per cent). Both industry and agriculture exceeded the plan targets. Gross agricultural output increased by more than 5 per cent, reaching one of the highest rates recorded in recent years. Within industry the most rapid expansion was in engineering, especially in the high technology branches. Qualitative changes in industry, namely reduced material intensity, further growth of labour productivity, and improvements in quality, have occurred. Furthermore, growth of capital investment was considerably higher than planned.

Among the other socialist countries of Eastern Europe, Bulgaria and Poland had the best growth performance. With increases in NMP exceeding 5 per cent, growth was considerably higher than in 1985 and surpassed the plan targets. There was not only a strong recovery in agricultural output (especially in Bulgaria, after a 1985 drought), but also a substantial growth of industry. The growth pattern in Czechoslovakia and the German Democratic Republic was similar to that of the group as a whole. Romania once again witnessed the highest growth in the region, but the increases in NMP of 7.3 per cent was well under 10-12 per cent planned.

The only country in which the output growth in 1986 remained sluggish was Hungary. After a setback in 1985, a modest NMP growth (a half percentage point) was achieved. This performance can be explained both by the general weakness of the Hungarian economy since the beginning of the 1980s and by the combination of adverse internal and external factors: a weak recovery of agriculture after the 5.5 per cent fall in output in 1985 and a decline of nearly 10 per cent in the terms of trade.

For the region as a whole there was a modest growth of the volume of exports while imports stagnated. Indeed, in 1986 two opposite tendencies could be observed. In the Soviet Union export volume rose significantly, while imports contracted. On the other hand, for the rest of the region export growth slowed and imports rose significantly. The volume of USSR exports to other socialist countries of Eastern Europe, as well as of intraregional trade in general, rose at an accelerated pace. Though the decline of its imports from other socialist countries of Eastern Europe was less pronounced than from developed market economies, the USSR had a large surplus in trade with its socialist trading partners, so that the problem of trade balancing within the region thus persisted.

The slow growth of trade volume was paralleled by a decline in the terms of trade for the USSR. The drastic deterioration in convertible currency terms of trade has been partially offset by a recovery in export volume and a contraction of imports. Nevertheless, for the second consecutive year the trade balance of the USSR with the developed market economies was in deficit, having more than tripled. Despite these adverse tendencies, the deficit was more than offset by a surplus in trade with developing and socialist countries. In dollar terms the USSR consequently had an overall positive balance, which was a significant improvement on the previous year.

Taken together, the other socialist countries of Eastern Europe experienced a slight deterioration in their convertible currency terms of trade and a one percentage point gain in their terms-of-trade with the Soviet Union. But, as a result of trade volume changes described above, their aggregate trade balance (on the basis of preliminary estimates in dollar terms) turned negative - for the first time in five years. The convertible currency losses, as well as the depreciation of the dollar, affected their overall current-account balance, which has continued to worsen since 1984 and may prove to have been for the region a a whole (i.e. including the USSR) as high as $2.2 billion in 1986 (according to the estimates by the ECE secretariat).

Changes in the system of economic management put in place in some countries of the region since 1985 have been reinforced by further restructuring. Reforms have focused on

Table 13

SOCIALIST COUNTRIES OF EASTERN EUROPE: GROWTH RATES OF EXPORTS AND IMPORTS (F.O.B.) BY MAJOR AREAS OF DESTINATION AND ORIGIN, 1985-1986

(Percentage increase over previous year, based on values in dollars)

	Exports		*Imports*	
Country	*1985*	*1986* [a]	*1985*	*1986* [a]
Bulgaria				
World	3.5	6.1	7.1	9.6
Developed market-economy countries	-3.0	-26.4	18.3	11.8
Developing countries	-1.7	-14.9	23.8	-12.5
Socialist countries [b]	5.6	14.6	3.2	12.3
Czechoslovakia				
World	1.6	16.2	2.5	19.2
Developed market-economy countries	-1.4	15.6	3.6	28.4
Developing countries	-8.0	4.3	-2.9	-0.4
Socialist countries [b]	4.0	18.2	2.8	19.4
German Democratic Republic [d]				
World	1.7	-1.8	2.1	4.3
Developed market-economy countries	1.8	3.5	0.8	13.7
Developing countries	-4.0	-29.9	-6.7	-14.2
Socialist countries [b]	2.4	-1.1	3.8	2.1
Hungary [c]				
World	-1.7	8.2	0.7	17.2
Developed market-economy countries	-14.6	12.0	11.6	14.8
Developing countries	-1.8	-14.8	-32.5	1.4
Socialist countries [b]	7.5	12.8	4.1	22.5
Poland				
World	-2.3	5.0	1.8	3.1
Developed market-economy countries	1.9	2.4	11.4	5.7
Developing countries	-10.5	12.2	1.0	-11.0
Socialist countries [b]	0.0	4.7	-2.8	4.4
Romania [d]				
World	4.6	7.6	14.5	30.5
Developed market-economy countries	-4.6	7.7	-0.3	29.4
Developing countries	-8.2	-19.9	8.1	5.4
Socialist countries [b]	26.2	25.1	27.1	49.9
USSR				
World	-4.9	11.8	3.4	7.2
Developed market-economy countries	-15.2	-16.0	-4.0	-2.3
Developing countries	-11.0	10.6	7.3	-10.8
Socialist countries [b]	4.5	25.9	6.4	20.2
Total [c]				
World	-1.8	8.9	3.7	9.7
Developed market-economy countries	-9.5	-5.6	0.4	5.9
Developing countries	-9.1	2.2	4.3	-8.3
Socialist countries [b]	4.9	17.6	5.1	16.7

Source: Data provided by the secretariat of the United Nations Economic Commission for Europe and estimates by the UNCTAD secretariat.

a Estimated.

b Socialist countries of Eastern Europe and Asia.

c Imports c.i.f. for Hungary only.

d Data for Romania and German Democratic Republic are preliminary based largely on partner data.

introducing more economic methods at all levels of the economy by attributing a more important role to prices, wages, credit, etc.

The process of economic reform was more transparent in 1986 in the Soviet Union. The measures being taken aimed at extending decision-making and managerial rights of individual enterprises, which are expected to become eventually economically autonomous, implying, *inter alia*, that there will be self-financing. On the other hand, enterprises are to be accorded greater responsibility in implementing plan targets. The role of central planning organs will thus be changed, the bulk of their activities consisting in dealing with long-term national goals. Other reforms, namely in the field of price formation, finance and credit, are also envisaged.

The economic reforms in the USSR have also touched upon foreign economic relations, important decisions in respect of which were adopted in 1986. Beginning the 1987, some industrial branches (through specialized firms) and individual enterprises have been given the right to engage in foreign trade directly, and the creation of joint ventures with foreign enterprises on the USSR territory is also being encouraged.

In the light of achievements in 1986 the short- and medium-term economic outlook for the socialist countries of Eastern Europe is optimistic. It would be premature to expect immediate results from the changes in management and planning systems, but their prompt implementation should help to stimulate the achievement of development goals. An overall improvement of the main economic indicators would suggest that the negative tendencies of the late 1970s and early 1980s have by and large been overcome. Nevertheless, to successfully pursue their long-term economic strategies (described in *Trade and Development Report 1986*) the socialist countries of Eastern Europe will need to expedite substantially their overall rates of technological progress, and to improve factor productivity and export competitiveness.

The basic element of the development strategy being pursued by the socialist countries of Eastern Europe is a faster rate of economic growth. In this respect, despite a slight weakening in performance in 1987, the planned aggregated NMP growth rate of close to 4.0 per cent is to be maintained. This growth path is expected to be supported by continuing buoyant investment, in the next two or three years at a rate lower than in 1986, but nevertheless higher than previously planned. As regards external economic relations, major changes in the near future seem unlikely: the international economic environment is not expected to favour strong growth of trade of the region as a whole. Nevertheless, there are prospects for the further development of trade, especially at the intraregional level.■

Chapter II

PROBLEMS OF CAPITAL FORMATION IN MARKET ECONOMIES

A. Introduction

Both developing countries and developed market-economy countries have experienced a marked slow-down of investment and growth since the beginning of the 1980s. However, the constraints confronting them have been very different. The developing economies have been dominated by a sharp reduction in external resource availabilities, both earned and borrowed, which has imposed acute stagflationary and budgetary pressures, prompting a severe tightening of macroeconomic policy. As a result, their supply capabilities have been reduced, activity levels have fallen and corporate profits and investment have been drastically cut and national savings have even been reduced. The experience of developed market economies, on the other hand, has been dominated by the shift of policy towards demand restriction that took place at the end of the 1970s in response to inflationary pressures. This has lowered the cost of material inputs and labour, reducing inflation and improving business profitability; but it has also hurt investment by deterring firms from expanding capacity. Another contrast is that, whereas in developed market economy countries the shift in the international distribution of income produced by the fall in commodity prices has offset the impact on corporate profits of the redistribution of national income produced by higher interest rates, both these changes have hit savings and investment in the developing countries. Thus:

- In developed market economies the improvement in the terms of trade brought about by the decline in oil and other commodity prices has made a major contribution towards bringing down *inflation*. By contrast, in developing countries these factors, together with the sharp rise in international interest rates and cuts in lending have, by necessitating sharp cuts in imports and diversion of domestic production to export markets, shrunk supply capabilities and domestic absorption and thereby accentuated inflation. Orthodox stabilization measures such as increased interest rates, reduced subsidies on basic goods, currency devaluations and restrictive demand management policies have often served to depress output and raise prices;
- *Corporate profits*, which constitute a major source of finance for investment, have fallen steeply in many troubled debtor countries, with severe repercussions on domestic financial institutions. The viability of domestic enterprises has, therefore, come to depend on official intervention. In the developed market economies, profit shares in value added have risen substantially since 1982, surpassing the levels attained during the late 1960s and early 1970s, thanks to declines in raw material and labour costs and, more recently, the decline in oil prices. However, this has not triggered the expected rise in private investment because capacity utilization has been declining and real interest rates have remained high, and because uncertainties have persisted regarding the future of the world economy

and the "rules of the game", particularly as regards exchange rates and protectionism;

- In many developing countries, *government budgets* have come under great strain, greatly reducing the scope for pursuing autonomous fiscal policies. Higher interest rates have increased the cost of servicing domestic debt while reduced tax receipts resulting from import contraction, lower export incomes and declines in the domestic tax base due to the overall slow-down of the economy have reduced government revenues. The budgetary pressures from these sources have come on top of those due to the rise in the domestic currency cost of servicing external debt following the rise in international interest rates and currency devaluations. Most of the burden of cuts has had to fall on investment, in view of the very large size of the fiscal improvement required. Nevertheless, even large-scale cuts in investment have often been insufficient to reduce budget deficits and contain inflationary pressures. In the developed market-economy countries (with the exception of the United States) government budgets have been moving towards surplus since the late 1970s. Unlike the situation in developing countries, this swing in budget balances has resulted from deliberate policy choices.

This experience indicates that increased "supply-side" incentives alone do not foster investment and growth; an expansion of demand and finance is also required. The need for more expansionary policies in some of the major OECD countries is now well-accepted. But, as regards developing countries, although official thinking has come to recognize the need to replace deflationary adjustment by "adjustment with growth", it has continued to put almost exclusive emphasis on "supply-side" policies and demand restriction, largely neglecting the need to improve the external trading and financial environment. Moreover, official thinking, particularly in financial circles, continues to ignore the scope for accelerating growth in developed market-economy countries by measures that would enable developing countries to step up their imports. The onus of adjustment therefore continues to be placed on developing countries, who are being called upon to compensate for the worsened external environment by intensifying their efforts to save and invest. These countries are caught in a vicious circle, for the very factors that have depressed investment have also made it extremely difficult to raise savings. Although there is room to improve the use of existing resources, such improvement cannot make up for the poor external environment, and it cannot be achieved through deflationary policies.

The co-existence of demand shortage in developed market-economy countries with supply shortage in developing ones means that the overall growth of the world economy could be accelerated significantly through a reorientation of policies. Faster demand growth in developed countries, together with increased financial flows to developing countries, would help to accelerate output growth in the developing countries and add further to growth in the developed countries. Unless policies are set in this direction, there is a danger that growth in both developed and developing countries will weaken further, bringing further deflation all round.

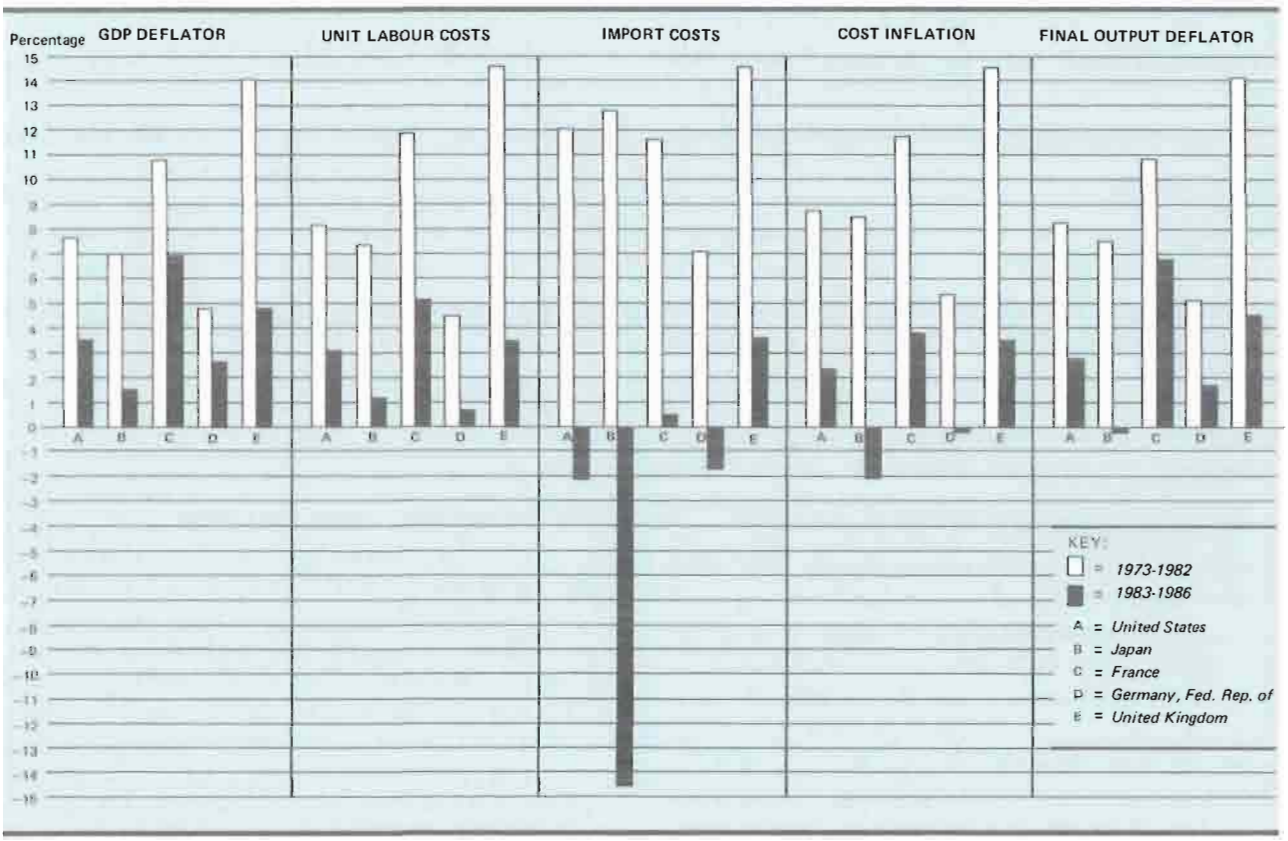
B. Profits and investment in developed market-economy countries

The medium-term financial strategies adopted by the major developed market economies at the end of the 1970s sought to reverse the decline in profit shares and rates of return which had occurred in the course of the decade, and which were believed to be responsible for slow growth and unemployment. Thanks to falling raw material prices and wage costs, business profitability has been restored. However, this has not triggered the investment boom that policy makers were expecting. The main reasons are: slow demand growth, which has kept capacity utilization rates low; continued high real interest rates; and uncertainties regarding the key macroeconomic variables and the trading system. Unless these problems are resolved, investment and growth are likely to remain subdued.

Chart I

PRICES AND COSTS IN MAJOR OECD COUNTRIES

(Average annual percentage change)



Source: See Annex table 12.

1. Introduction and background

The view is widely held that the sharp slowdown in growth and rise in unemployment that took place in the major OECD countries in the 1970s were caused by shifts in relative prices and in income distribution. Secular trends in the pace of technical progress, productivity, profitability and international competitiveness are said to have impaired economic performance, and in a number of countries the evolution of the socio-economic structure is thought to have reduced the responsiveness of supply. Consequently, according to this view, the OECD countries found it extremely difficult to cope with the two sharp increases in oil prices.[51]

A smooth adaptation would have required a decline in real wages relative to productivity and a substantial rise in new investment in order to help restructure the economies in line with changed relative prices and to bring about faster productivity growth. However, this was not how most OECD countries responded to the first oil price rise. In order to avert its deflationary impact, governments allowed domestic demand to rise substantially which, it is argued, set off an inflationary wage-price spiral, thus placing the burden of adjustment ultimately on profits alone; the commodity boom during the second half of the decade is also said to have added to pressures on costs and profits. The fall in profitability, in turn, reduced the incentives to invest, while the disparity between the growth of real wages and productivity in most cases caused unemployment to rise.

The policy response to the second oil price rise, at the end of the 1970s, was different. In all the major OECD countries monetary policy was drastically tightened and in most

51 For this conclusion see, for example, *OECD, Economic Outlook*, No. 31, July 1982, pp. 6-7.

fiscal policy was also restrictive. The aim was twofold: to reduce inflation and to restore former patterns of relative prices and income shares. As stated by the OECD secretariat, "aggregate demand policy was set in many countries so as not to accommodate the oil-price-induced acceleration in the rate of growth of nominal GDP. It was considered important not only to reduce inflation in its own right, but also to moderate the growth of labour costs relative to product prices, and to restore profit margins to levels sufficient to support a higher rate of investment."[52] A central plank of the new strategy was the reduction of public expenditure which was sought in order to permit taxes to be cut and to reduce the growth of public debt in an effort to check the "crowding out" of private investors in financial markets and thereby allow growth based on private investment.

As pointed out in *Trade and Development Report 1986*, this new policy stance generated a deep and prolonged recession, followed by a weak and lopsided recovery characterized by trade and financial imbalances. Nevertheless, governments have succeeded in meeting some of their objectives. The inflationary trend has been successfully reversed: by the end of 1982 inflation had been cut by half, and it has now come down to the lowest level for more than three decades in some countries. Moreover, there has been significant "correction" in relative prices and incomes. The collapse of oil and non-oil commodity prices and the substantial moderation in wage costs that has taken place have been major factors in this process of disinflation-*cum*-relative-price adjustment.

This chapter discusses this adjustment process and its implications for growth in major OECD countries. It addresses three main issues: first, the extent to which this process has restored pre-1973 relative prices and incomes, and in particular profits; second, and more important, the extent to which the supply-side, private sector response has been forthcoming; and third, the role of other determinants, on both the supply and the demand sides, of investment and capacity utilization by the private sector.

2. *Costs and prices*

The sharp swings in costs relative to output prices during the 1970s and the 1980s are shown by chart I and table 14. To examine the impact of relative price changes on profits two types of comparison are carried out. First, for the economy as a whole, total final output (and consumer) prices are compared with total import costs and unit labour costs in the business sector; for the manufacturing sector, producers' prices are compared with unit labour and imported material costs of the sector. Second, the domestic value added component of the overall price trend (i.e. the GDP deflator) is compared with unit labour costs in the business sector.

(a) 1973-1982

During the period 1973-1982 total import costs on average rose faster than both consumer and total final output prices in almost all major OECD countries (chart I). Differences among countries reflected the differences not only in the composition of imports but also in the movements of exchange rates. Despite an appreciation of the effective exchange rate of the yen (on average 2.8 per cent per annum), Japan experienced a rapid increase in its import prices because of the relatively higher share of oil in its total imports. In the United Kingdom the fall in the exchange rate (2.9 per cent per annum) added further to rises in the prices of its imports whereas in the Federal Republic of Germany the appreciation of the deutsche mark (4.2 per cent per annum) helped to alleviate the cost-push originating from imports.

When import costs rise relative to output prices, profit margins fall, unless unit labour costs lag behind output prices. In some countries, notably France and the United Kingdom, unit labour costs in the business sector ran ahead of final output prices. In others, they fell behind, but not enough to compensate for the rise in import costs. Indeed, during 1973-1982 total costs, as measured by a weighted average of unit labour and import costs, grew faster than final output prices in all countries. In other words, the rate of inflation was less than would have been justified on the basis of the behaviour of labour productivity, nominal wages and import costs. Thus, all countries experienced declines in (gross) profit margins (mark-up) over costs. This is confirmed by the movement of the domestic component of over-

52 *Ibid.*, p. 9.

all prices, i.e. the GDP deflator, which rose less than unit labour costs in the business sector.

In manufacturing during 1973-1982, the rise in imported material costs outstripped that in producer prices because of the increases in oil prices (table 14). Non-oil material prices kept up with producer prices; the non-oil commodity price collapse during 1980-1982 more than offset the earlier price boom during 1977-1979. Real unit labour costs (i.e. those measured in terms of producer prices), on the other hand, fell in Japan and the United States, remained relatively stable in the Federal Republic of Germany and the United Kingdom, but rose in France. These disparate movements in real unit labour costs during the 1970s between Western Europe, on the one hand, and the United States and Japan, on the other, have given rise to a feeling that labour markets and real wages in Western Europe are relatively more inflexible. However, as will be seen below, such disparities have sharply declined during the 1980s.

The collapse of non-oil commodity prices, together with the flattening of oil prices, provided much of the disinflationary stimulus in the OECD countries during the early 1980s. After rising by more than 11 per cent per annum during 1978-1980, the prices of non-oil commodities imported by OECD countries fell by more than 7 per cent per annum during the subsequent two years. Crude petroleum prices, on the other hand, rose by a couple of percentage points during 1981-1982, after a jump in the previous two years. The direct disinflationary effect of these price movements amounted to about three-quarters of the decline that actually took place in the rate of inflation during 1980-1982, as they were largely passed onto final output prices. As inflation decelerated, wage costs also moderated. It has been estimated that, allowing for the indirect effect on the moderation of wage costs, the commodity price slow-down during 1980-1982 accounted for all the decline in inflation in the OECD area.[53] However, in the majority of countries inflation appears to have fallen much faster than could be accounted for by the moderation of wage costs and commodity prices throughout the 1980-1982 recession, resulting in a further profit squeeze.

(b) 1983-1986

The situation changed significantly after 1982. After a mild recovery in 1983-1984 non-oil commodity prices declined further during 1985-1986, while oil prices collapsed. In almost all countries import costs of both oil and non-oil commodity inputs declined in absolute terms (table 14). This has been the major factor in the sharp swing in total import costs, which declined in absolute terms in the United States, Japan and the Federal Republic of Germany (chart I). In Japan the decline has reached 15 per cent per annum, due largely to the appreciation of the effective exchange rate of the yen (about 11.5 per cent per annum). In the United Kingdom import costs have continued to rise, though moderately, due to the depreciation of sterling.

Labour costs have also decelerated sharply; compared to 1973-1982, the average rate of growth of unit labour costs in the business sector declined by between 4 and 11 percentage points per annum, the largest swing taking place in the United Kingdom. In general, the slow-down in unit labour costs was more marked in manufacturing than in the business sector as a whole. In Japan and the United States unit labour costs in manufacturing declined during 1983-1986 due to faster productivity growth and moderation in hourly wages. In the United Kingdom the relatively faster rise of unit labour costs in manufacturing than in the business sector as a whole stemmed more from differences in the pace of hourly earnings than in productivity growth.

Since 1982 the decline in import costs and the moderation in unit labour costs have not been fully reflected in final output prices. A full pass-through would have reduced final output prices by about 2.1 per cent per annum in Japan and 0.2 per cent in the Federal Republic of Germany, but the pace of change in final output prices (and also consumer prices) has exceeded the rate of inflation attributable to cost changes; this has also been true in the United States, France and the United Kingdom, where final output (and consumer) prices have increased faster than costs. Indeed, in all countries the domestic component of the overall price trend (i.e. the GDP deflator) has increased more than unit labour costs in the business sector. Similarly, in manufacturing producer prices have risen faster than unit

53 Wilfred Beckerman and Tim Jenkinson, "What stopped the inflation? Unemployment or commodity prices?", *The Economic Journal*, March 1986.

Table 14

PRICES AND COSTS IN MANUFACTURING IN THE MAJOR OECD COUNTRIES

(Average annual percentage change)

Country	Producer prices	Unit labour costs	Imported commodity input costs		
			Total	Non-oil	Oil
1973-1982					
United States	9.1	7.3	24.3	7.7	27.6
Japan	7.0	4.1	22.1	7.1	24.2
France	9.6	11.0	..	..	29.7
Germany, Federal Republic of	5.3	5.2	16.8	5.0	23.1
United Kingdom	14.3	14.7	26.8	12.6	31.1
1983-1986					
United States	0.8	-0.2	-16.2	-2.7	-17.6
Japan	-1.6	-0.6	-21.5	-12.3	-22.0
France	4.9	3.7	..	..	-12.0
Germany, Federal Republic of	0.8	0.3	-14.6	-3.0	-15.3
United Kingdom	5.4	3.7	-7.4	2.1	-9.6

Source: UNCTAD secretariat estimates based on OECD, *Historical Statistics, 1960-1984*; OECD, *Main Economic Indicators* (various issues); OECD, *Monthly Statistics of Foreign Trade* (various issues); UNCTAD, *Handbook Supplement of Trade and Development Statistics, 1986*; UNCTAD, *Monthly Commodity Price Bulletin* (various issues); International Energy Agency, *Energy Prices and Taxes* (various issues).

labour costs in the Western European countries; in other words, output prices have been more rigid than labour costs. In Japan, unlike the business sector as a whole, real unit labour costs in manufacturing have increased as producer prices have declined faster than unit labour costs. In the United States, on the contrary, real unit labour costs in manufacturing have declined over the last four years.

The swings that have taken place in prices and costs during the last four years have gone a long way towards restoring their pre-1973 relationship. Table 15 translates the data in table 14 and Annex table 12 into index numbers in order to compare the recent swing with those in the 1970s and early 1980s. In the business sector as a whole real unit labour costs in 1986 stood at the 1972 level in the United Kingdom, indicating that real wages have, on average, kept up with productivity growth. In the United States, Japan and France, the recent declines in real unit labour costs in the business sector as a whole have not been sufficient to restore the 1972 parity between real wages and labour productivity, but the "correction" has been substantial. In the Federal Republic of Germany, on the contrary, the cumulative increase in real wages has been about 10 per cent less than the increase in labour productivity.

In manufacturing, in all countries except France, unit labour costs have declined in real terms. The decline has been bigger in the United States and Japan than in the Federal Republic of Germany and the United Kingdom largely due to the behaviour of wages in the 1970s. Nevertheless, in the latter countries the cumulative swing in productivity relative to real wages amounts to 3 per cent. In short, in these countries the real wage gap that accumulated over a decade has been more than closed in a matter of four years.

Total material costs in real terms stand at 45-75 per cent over their 1972 levels. Non-oil material import costs declined by between 17 and 35 per cent in terms of producer prices in manufacturing. Oil prices in real terms stood in 1986 above their levels in 1972, despite the fact that oil has lost all its real gains from the

Table 15

PRICES AND COSTS IN THE ECONOMIES OF THE MAJOR OECD COUNTRIES IN 1986

(Index numbers, 1972 = 100)

Country	Real unit labour costs		Real import prices [b]			Total costs [c] relative to:	
	Total business [a]	Manufacturing [b]	Total	Non-oil	Oil	Consumer prices	Final output prices
United States	103	81	176	76	214	96	103
Japan	103	79	152	64	175	88	101
France	104	108	..	..	267	95	98
Federal Republic of Germany	90	97	145	83	238	96	94
United Kingdom	99	97	168	72	202	95	99

Source: As for table 14 and Annex table 12.
a Nominal costs deflated by implicit GDP deflator.
b Nominal costs deflated by the index of producer prices in manufacturing.
c See Annex table 12, column 6.

1979-1980 price rises and part of its gains from the earlier rises, returning to its immediate post-war levels in real terms. In view of a rapid structural adaptation that the OECD countries have made in the use of oil alongside labour, capital and other raw material inputs, the present level of the real price of oil compared to the early 1970s is unlikely to represent a significant "distortion".

Indeed, cumulative changes in total costs relative to output prices indicate that in 1986, compared to 1972, while oil prices are higher in real terms, this has been largely compensated for by lower real non-oil material and labour costs. In all countries the consumer price index in 1986 stood higher than the level of the combined import and labour cost index, while final output prices were, on average, in line with total costs.

3. *Profits and rates of return*

The foregoing analysis suggests that there has been a substantial recovery in profit margins and shares in recent years; in some countries, they may have been restored to their levels of the early 1970s. While statistical data on profits suffer from measurement problems, the available evidence from various sources is broadly consistent with the indications given by movements in costs and prices.

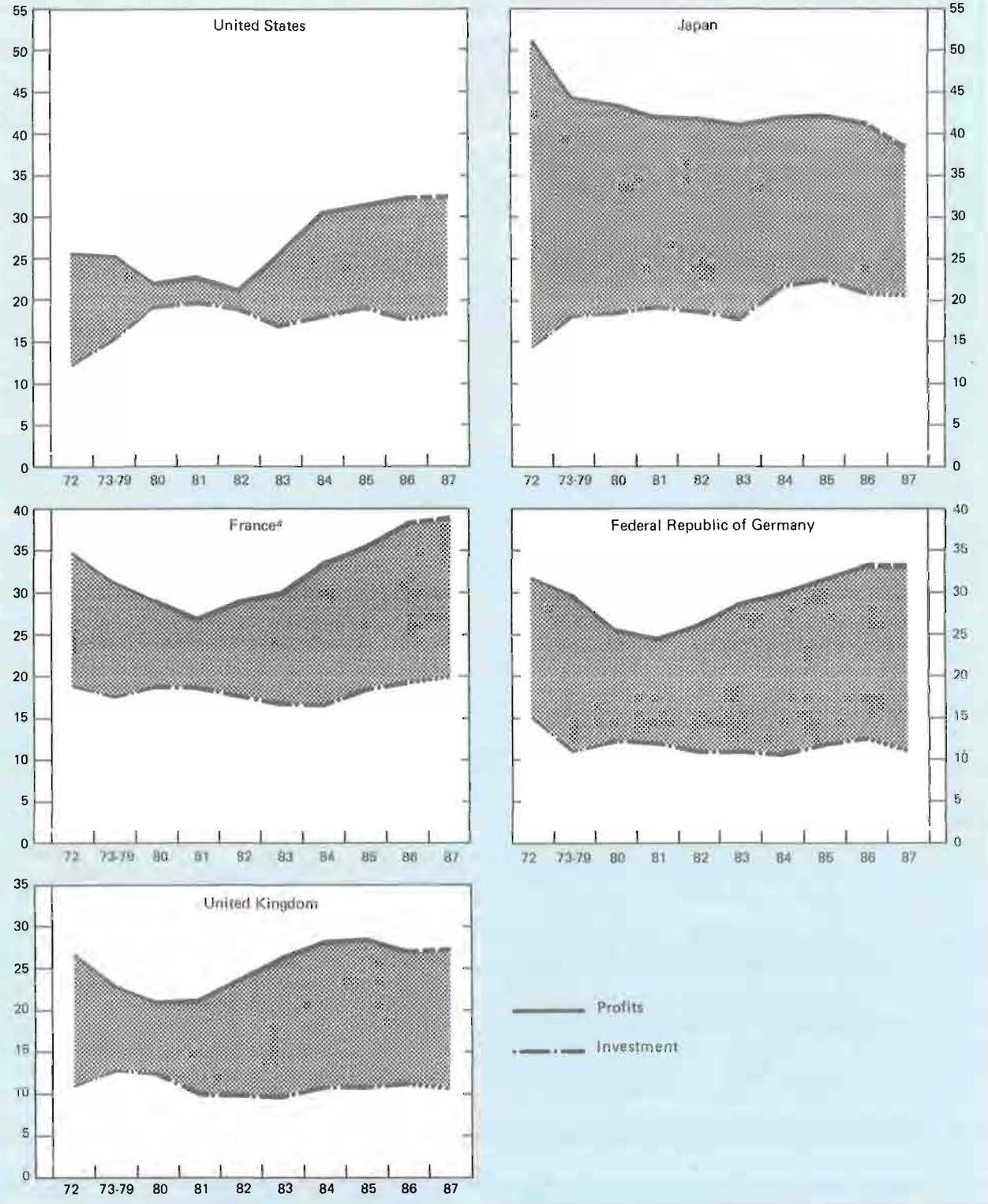
In all major OECD countries gross profit shares in manufacturing fell during the 1970s (chart II). The decline was more marked in the United Kingdom, France and Japan than in the United States and the Federal Republic of Germany. In Japan producer prices in manufacturing rose much faster than unit labour costs, but not sufficiently to offset fully the increased cost of materials. Nevertheless, despite a substantial decline, profit shares in Japan at the end of the 1970s stood well above those in the other countries, as the share of profits in the early 1970s had exceeded half of the total gross value added in manufacturing. In all countries profit shares in manufacturing declined further during the 1980-1982 recession, and with the exception of the United Kingdom the recession troughs were below the lowest levels reached during the 1970s.

The recovery in profit shares started in 1981 in the United Kingdom, in 1982 in the Federal Republic of Germany and France, and in 1983 in the United States. They have risen for four successive years in the United States, and five in the European countries. In all these countries profit shares in manufacturing are now higher than in 1972. The available statis-

Chart II

MAJOR DEVELOPED MARKET-ECONOMY COUNTRIES: SHARES OF GROSS PROFITS AND INVESTMENT IN VALUE ADDED IN MANUFACTURING INDUSTRY

(Per cent)



Source: UNCTAD secretariat estimates and projections, based on: OECD, *National Accounts 1960-1985*; OECD, *Main Economic Indicators*, various issues; *European Economy, Supplement B*, No. 1, January 1987; national statistics.

a Including also mining and energy.

tical evidence indicates that the rise in profit shares reflected a substantial increase in mark-up over costs. The average profit mark-up during 1980-1983 was 11.9 per cent in the United States, 9.5 per cent in the Federal Republic of Germany and 9.2 per cent in the United Kingdom. During the next three to four years it averaged 14.2 per cent in the United States, 11.2 per cent in the Federal Republic of Germany and 11.9 per cent in the United Kingdom.[54]

In Japan, the level of profits in manufacturing has depended to a large extent on export performance and the value of the yen, and has shown substantial fluctuations during the 1980s. They recovered in 1983-1984 but have fallen sharply since September 1985; but as nominal value added in manufacturing has also fallen, this has not resulted in a sharp decline in the share of profits. "For the semi-annual term ended September 30, 1986, companies reported the steepest drop in revenues and earnings since ... September 1985 ... Strong yen-induced decreases in merchandise exports, a slow-down in the domestic economy, and drops in the prices of finished goods that exceeded declines in those of raw materials and fuels are largely blamed for these drops in revenues and earnings."[55] However, since the exchange rate and exports did not affect all branches of industry equally, there have been substantial intra-industry variations in the movement of profits; indeed, during 1985-1986 profits declined much less in industry as a whole than in the manufacturing sector. In any case, profit shares in Japan during 1983-1986 have not, on average, been higher than during the late 1970s and early 1980s.

In all countries the gross rate of return in manufacturing fell between 1972 and 1979 (chart III). In relative terms the drop was substantially greater in Japan, France and the United Kingdom than in the United States and the Federal Republic of Germany. With the exception of the Federal Republic of Germany, the gross rate of return in manufacturing fell faster than profit shares during 1973-1979, indicating a substantial decline in gross output per unit of gross capital stock (or "capital productivity"). The latter declined by about a cumulative 20 per cent in Japan and France, 15 per cent in the United States and the United Kingdom, but by less than 2 per cent in the Federal Republic of Germany.

Rates of return were further depressed during the subsequent recession due to falls in both profit shares and "capital productivity"; with the exception of France, they fell much faster than profit shares from 1979 to the recession trough. It is notable that in the United States and the Federal Republic of Germany, cumulative declines in "capital productivity" and rates of return during this period far exceeded the total declines from 1972 to 1979. Between 1972 and the recession trough "capital productivity" fell by around 31 per cent in the United States, Japan and the United Kingdom, 13 per cent in France and the Federal Republic of Germany; and rates of return fell by more than 40 per cent in the United States, Japan and the United Kingdom, and 30 per cent in France and the Federal Republic of Germany.

Rates of return in manufacturing recovered along with profit shares from 1981-1982 onwards, rising almost continuously in all countries except Japan; in the United States, the Federal Republic of Germany and the United Kingdom the positive impact of higher profit shares has been reinforced by increases in output per unit of capital. However, these gains in productivity and profit shares did not make up for the earlier productivity losses in some countries. In France and the United Kingdom rates of return were still lower in 1986 than in 1972, despite a significant recovery. In the United States and the Federal Republic of Germany the 1972, rates were exceeded and restored, respectively, whereas in Japan the rate of return in the 1980s has been well below its level in the early 1970s. Variations among countries in their rates of return in manufacturing have substantially decreased. However, in the United Kingdom the rate of return remains well below those of other major OECD countries.

Profit shares and rates of return are only rough indicators of profitability. Allowance must also be made for interest and tax payments and capital consumption, and movements in the user cost of capital (i.e. interest and depreciation, adjusted for changes in the prices of capital goods), and taxes on profits must be explicitly considered, particularly since interest rates rose sharply during the 1980s.

An exercise carried out by the secretariat of the Economic Commission for Europe shows that in the United States and Western European countries there were substantial in-

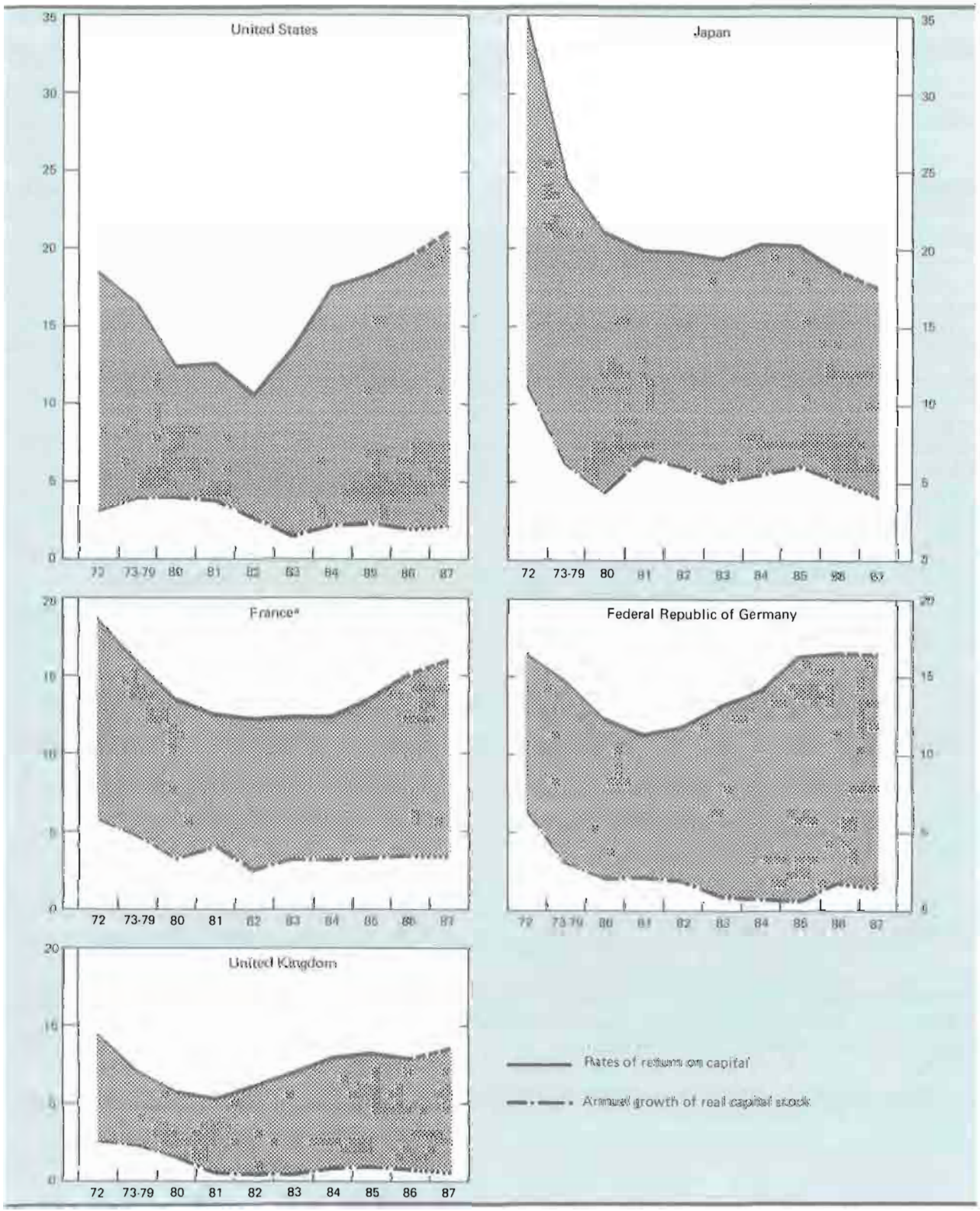
54 The figures for the latter period are for 1983-1985 for the United States and 1983-1986 for the Federal Republic of Germany and the United Kingdom.

55 Nomura Research Institute, *Quarterly Economic Review*, February 1987, p. 18.

Chart III

MAJOR DEVELOPED MARKET-ECONOMY COUNTRIES: RATES OF RETURN ON CAPITAL AND GROWTH OF REAL GROSS CAPITAL STOCK IN MANUFACTURING INDUSTRY

(Per cent)



Source: As for chart II.

a Including also mining and energy (as well as transport and communication in the case of capital stock).

creases in unit (pre-tax) profits for the total economy during the last four years, even when allowance is made for the user cost of capital. The approach was to estimate the inflation rate that would have occurred if prices had changed only in line with the user cost of capital and unit labour costs. This "underlying cost inflation" was compared with actual inflation (as measured by the GDP deflator) in order to assess whether unit profits had increased more or less than unit capital costs. The findings "confirm that since 1982 there has been a strong improvement of profits; in all countries, the operating surplus rose faster than unit costs and the difference has tended to widen in the larger countries."[56]

With the exception of Japan and the United Kingdom, interest payments absorbed a larger proportion of net operating surplus (i.e. gross surplus adjusted for capital consumption) in the non-financial corporate sector during the 1980s than the 1970s, largely due to substantial rises in interest rates (table 16). In Japan and the United Kingdom the decline in income-gearing ratio (i.e. interest payments as a proportion of operating surplus) reflected a decline in debt relative to equity finance; during the 1980s the proportion of corporate debt to total capital was significantly lower than in the 1970s.[57] In the Federal Republic of Germany, the rise in the ratio of net interest payments to net operating surplus during the 1980s remained relatively small because debt finance fell in relative terms and the rise in interest rates was less pronounced than in profit shares. Thus, in the Federal Republic of Germany and the United Kingdom the restructuring of balance sheets which firms undertook after 1981-1982 in order to reduce indebtedness relative to equity helped to mitigate the incidence of high real interest rates. This restructuring was prompted by the increased vulnerability of firms to rises in interest rates during the late 1970s and early 1980s - low real interest rates in the 1970s and the tax deductibility of interest payments had encouraged firms to raise their income-gearing ratios to record levels - and was facilitated by increased profits. The debt-equity ratio rose somewhat in the United States and France during the early 1980s, but the rise in interest payments was largely a reflection of the sharp increases in interest rates. It appears that in France, too, the income-gearing ratio has fallen during the last couple of years as companies have used increased profits to strengthen their balance sheets.

In all countries the proportion of net operating surplus absorbed by interest payments was considerably lower during 1984 (or 1983) than in the recession peaks; since in the past two years interest rates have fallen, the restructuring of balance sheets has continued and gross operating surpluses have increased substantially in most countries, the decline must also have certainly continued. Indeed, the estimates of the Economic Commission for Europe cited above on the difference between unit profits and unit capital costs strongly suggests that the fall in interest rates has been at least partly absorbed by larger net profits. It can therefore be concluded that interest payments as a proportion of net profits are currently not very much above their levels in the 1970s; in the Federal Republic of Germany they are probably lower. In any case, since interest payments are tax-deductible for firms with taxable profits, the swing from negative to positive pre-tax net profits in the 1980s in a number of companies will have meant even greater improvements in profitability.

However, this improvement in profits net of interest payments may have partly been offset by a decline in holding gains (i.e. changes in the real value of assets and liabilities) during the last few years. Since firms are normally net debtors, holding gains on their net monetary liabilities are greater, the higher the rate of inflation. When interest rates fall in real terms, holding gains would rise relative to net interest payments, particularly when real interest rates are negative. Such offsets were considerable during the middle and late 1970s when inflation was accelerating but real interest rates remained low, particularly in the United States, France and the United Kingdom.[58] The decline in inflation and the rise in real interest rates from 1982 onwards must have entailed substantial reductions in holding gains compared to interest payments.

The tax treatment of corporate profits, as measured by the total direct tax payments as a percentage of net profits, improved in most of the major OECD countries during the 1980s compared to the 1970s. The greatest decline in the effective direct tax rate was in the United States, due to the tax reliefs brought about by the 1981 Economic Recovery Tax Act. The direct tax burden on profits also declined con-

56 *Economic Survey of Europe in 1986-1987* (United Nations publication, Sales No. E.87.II.E.1), pp. 18-20.

57 See OECD, *Non-Financial Enterprises Financial Statements, 1986*; see also the article by J.H. Chan-Lee, cited in the sources listed for table 16.

58 See James H. Chan-Lee and Helen Sutch, "Profits and Rates of Return", *OECD, Economic Studies*, No. 5, Autumn 1985, pp. 157-158.

Table 16

NET INTEREST PAYMENTS AND DIRECT TAXES AS A PERCENTAGE OF NET OPERATING SURPLUS IN MAJOR OECD COUNTRIES

(Non-financial corporate sector)

Period	United States	Japan	France	Federal Republic of Germany [a]	United Kingdom
			Interest		
1973-1979 [b]	23.7	53.8	44.4	26.7	40.0
1980	32.2	51.1	52.8	26.6	42.0
1982	40.7	49.6	78.2	33.8	30.0
1984	31.8 [c]	47.6	63.5	28.8 [c]	21.0 [c]
			Taxes		
1973-1979 [b]	32.3	25.1	27.8	41.3	25.9
1980	30.0	24.8	31.3	40.4	37.2
1982	18.4	26.7	35.6	34.8	40.3
1984	19.9 [c]	27.0	24.8	33.9	34.5 [c]

Source: *Interest payments:* United Kingdom: James H. Chan-Lee, "Pure Profits and Tobin's *q* in Nine OECD Countries", *OECD Economic Studies*, No. 7, Autumn 1986, table 5; other countries: OECD national accounts data. *Taxes:* United States, France and the United Kingdom: OECD national accounts data; Federal Republic of Germany: Statistisches Bundesamt, *Fachserie 18*, Reihe 1.

a Financial and non-financial corporate sector for taxes in the Federal Republic of Germany.

b Total payments over the period divided by total net operating surplus. For interest payments in the United Kingdom the average is for 1974-1979.

c 1983.

tinuously in the Federal Republic of Germany; the latest available figures are below the average of the 1970s. This is also true for France, which, however, experienced substantial rises during the early 1980s. The combined claim of direct taxes and net interest payments on firms' net operating surpluses was lower in 1984 than in the 1970s in all countries except France. It can also be expected to have declined substantially in France during the last couple of years due to the reduction in income-gearing ratio and a more favourable tax treatment of corporate profits.

4. *Financial market indicators*

The foregoing analysis clearly indicates that there has been a substantial recovery in recorded profits net of interest and tax payments, particularly in Western Europe and the United States, during the last four to five years. This implies that the economic viability of the existing capital stock has greatly improved and that firms have at their disposal an important source of finance. However, the relevant variable in decisions to undertake new investment is not current, but expected, profits, net of the cost of financial capital from all sources.

Recorded rates of return in relation to real interest rates provide a rough indicator of

Table 17

ANNUAL AVERAGE REAL LONG-TERM INTEREST RATES [a] IN MAJOR OECD COUNTRIES

(Per cent)

Period	*United States*	*Japan*	*France*	*Federal Republic of Germany*	*United Kingdom*
1973-1979	-0.9	-1.3	0.2	2.6	-2.5
1980-1982	3.5	4.5	3.2	4.0	0.3
1983-1986	7.6	7.1	6.5	5.4	5.4

Source: UNCTAD secretariat calculations, based on OECD, *Main Economic Indicators* (various issues) and OECD, *Quarterly National Accounts* (various issues).

a Long-term government bond yields less the rise in the implicit deflator of final demand.

expected net profitability of new investment. Along with the rise in the rate of return on capital, the 1980s have witnessed a substantial increase in real long-term interest rates compared to the 1970s (table 17). The increase has been more pronounced since 1982; the pace of the decline in nominal interest rates has been much slower than the deceleration in inflation. In the United Kingdom the margin of the rate of return on capital over real long-term interest rates fell from over 5 percentage points in 1980-1982 to under 1 percentage point in 1986, despite a substantial recovery in the rate of return. The decline was more moderate in Japan. In France the margin remained stable, whereas in the United States and the Federal Republic of Germany, where the rates of return rose much faster than real long-term interest rates, the margins improved. In any case, in all countries the present rates of return on capital in manufacturing compare much less favourably with real long-term interest rates than they did in the 1970s, when the latter were low or negative.

Some measures of expected profitability relative to the cost of capital from all sources can be derived from financial market indicators. One such measure is the so-called q, or the valuation, ratio, measured as the ratio of market valuation of existing assets to the replacement cost of these assets. Under the assumption of market efficiency, this ratio will indicate the movement of the expected rate of return on physical capital assets relative to the supply cost of capital based on financial market expectations.[59]

Available estimates show that the valuation ratio has risen considerably since the early 1980s in all countries, indicating that the markets' assessment of firms' future net earning capacity has substantially improved.[60] In Japan the rise continued on the upward trend of the 1970s, whereas in the United States and Western Europe it represented a recovery from a downward trend. In these latter countries, except France, the estimated swing has been exceptionally large, raising the q ratio towards or above its theoretical equilibrium level of unity, where the market valuation of existing assets is equal to the current cost of new capital goods.

The movements in share prices and earnings yields (i.e. the reciprocal of the price-earnings ratio) give similar indications (table 18). Share prices have increased continuously on an annual basis since 1981-1982, reaching very high levels in 1986. These increases have outstripped the rise in earnings in the three major stock markets, raising the price-earnings

59 The valuation ratio is defined as the ratio of the expected rate of return (i.e. the ratio of expected profits to the replacement cost of existing capital) to the expected cost of capital (i.e. the ratio of expected profits to the market valuation of existing capital). Since profit expectations are not directly observable, the valuation ratio is derived from the ratio of these two ratios on the assumption that financial markets reflect investors' expectations of profitability.

60 See Chan-Lee, *op. cit.*

Table 18

INDEX NUMBERS OF SHARE PRICES AND EARNINGS YIELDS IN MAJOR OECD COUNTRIES

(1980 = 100)

	Share prices					*Earnings yields*		
Period average	*United States* [a]	*Japan* [b]	*France* [a]	*Federal Republic of Germany* [a]	*United Kingdom* [c]	*United States* [a]	*Japan* [d]	*United Kingdom* [c]
1978	79	88	68	100	82	102	79	91
1982	99	116	86	100	131	111	74	60
1984	135	172	157	145	196	82	59	59
1986	193	279	285	253	300	63	30	56

Source: *Share prices:* OECD, *Main Economic Indicators* (various issues). *Earnings yields:* Japan: Nomura Research Institute, *Quarterly Economic Review* (various issues); United States: *Survey of Current Business* (various issues); United Kingdom: Central Statistical Office, *Economic Trends* (various issues).

a Industrials.
b Tokyo Stock Exchange.
c *Financial Times* actuaries (industrials and oil and gas).
d Nomura Research Institute 400 composite.

ratios to record levels. The buoyancy in stock markets and the substantial decline in equity costs imply that real interest rates on debt overstate the present supply cost of capital compared to the 1970s and early 1980s, when real interest rates were lower but equity costs higher (though less so in continental Western Europe, where debt-equity and income-gearing ratios are still very high).

While high share prices may partly reflect the rise in the rate of return on equity (i.e. total income, including net property and interest incomes, divided by the net worth of business) stemming from reduced claims of interest (and tax) payments on operating surplus and a substantial recovery of the surplus, it appears that share prices have increased much more than the rate of return on equity. On one interpretation, this means that there has been a considerable recovery in market expectations of future profitability of the existing capital stock compared with the observed profitability.

However, the validity of this conclusion depends on what is assumed about market efficiency. Equity (and bond) prices are subject to strong speculative influences; they also depend on the availability of loan capital relative to the supply of corporate securities.

This point can be illustrated by the behaviour of share prices on the Tokyo Stock Exchange. Share prices continued to climb during 1985-1986, despite the fact that profits slowed down in the business sector as a whole and fell in manufacturing. The continued rise in share prices reflected, in great part, a mismatch between the pace of demand and of supply. The decline of the dollar diverted part of the funds from the United States to home markets, and the increased demand for equities surpassed the additional supply that Japanese firms were willing to create. Firms' behaviour was influenced largely by the slow-down of export markets and reflected a less optimistic assessment of future profitability; total stocks issued declined in 1985 compared to 1984, and declined again in 1986, increasing the pressures in secondary markets.

In continental Western Europe stock prices are not reliable indicators of future profitability assessments, since equity markets are underdeveloped and individual stock ownership is limited. In the United States and the United Kingdom the rise in share prices relative to earnings has been more moderate than in Japan. While this may reflect partly the rise in the rate of return on equity (on which up-to-date information is not available) and partly a higher expected rate of return than at present,

the existence of a "speculative bubble" cannot be ruled out.

5. *Investment, employment and activity*

In the absence of strong counteracting influences, particularly on the demand side, the supply response to recent swings in relative prices and profitability should entail increased capacity utilization, employment and investment in the majority of the countries that have been considered in this chapter. In theory, increased profitability should increase the rate of utilization of existing capacity and the quantities and the rates of utilization of labour and material inputs (including energy) and raise the volume of business investment. Moreover, new investment should become more labour (and material input) intensive because of the decline in labour (and material) costs relative to the user cost of capital, particularly in Western Europe.

However, as stated by the OECD secretariat, "the increase in profits does not yet appear to have been reflected in a significant increase in investment by the business sector"[61]; nor is it expected to make a significant recovery in the coming years. During 1983-1986 the average share of value added spent on investment in manufacturing has been more or less the same as in 1973-1979 in France and the Federal Republic of Germany, but lower in the United Kingdom. Moreover, in all these countries the 1983-1986 averages were not higher than those attained during the 1980-1982 recession. Although there was some recovery after 1984, there has been a slowdown in recent months. Thus, the proportion of value added devoted to investment has substantially lagged behind the sharp rises in profit shares in the major Western European countries (chart II).

The weakness in spending on fixed capital formation in Western Europe has also been reflected in the growth of gross capital stock. Whereas in the three previous upswings business capital stock rose, on average, by more than 14 per cent over the three-year period after the trough in the three major Western European countries, in the three years of the recovery after 1982, business capital stock growth remained under 8 per cent. In all three countries the annual rate of growth of gross capital stock in manufacturing has been lower during 1983-1986 than during the 1970s and early 1980s (chart III). In the United Kingdom it remained stable during 1985-1986, after a moderate recovery in 1984, whereas in the Federal Republic of Germany it has declined almost continuously from 1980 to 1985; the recovery in 1986 has been followed by a slowdown. In France it picked up after 1982, but has remained below the 1973-1979 average.

In the United States the rate of growth of business investment during 1983-1985 was three times that of Western Europe. Total business investment increased much faster in the first three years of the recovery than the average of the three previous upswings; it also surpassed the rise in GDP. While the rate of growth of business capital stock remained more or less the same as in previous upswings, it exceeded the average rate in Western Europe by 5 percentage points. However, most of this rise in investment took place outside manufacturing; gross investment in manufacturing as a proportion of gross value added during 1983-1986 was lower than in 1980-1982 but higher than in 1973-1979, whereas the rate of growth of real gross capital stock was lower compared to the 1970s and early 1980s. After 1985 the rate of growth of investment declined not only in absolute terms but also relative to the growth of value added.

In Japan total business fixed investment rose almost as fast in the first three years of the recent recovery as in previous upswings, and much faster than in Western Europe, but somewhat slower than in the United States. The duality of the growth pattern between Japan's manufacturing and non-manufacturing industries has also been reflected in the behaviour of investment after 1985. While gross investment as a proportion of gross value added remained stable in the industry as a whole, it fell in manufacturing industries; the growth of gross capital stock in manufacturing slowed down substantially even compared to 1980-1982.

The investment that has been made in order to replace and expand capital stock in manufacturing since 1982 has not added to employment in Western Europe (table 19). In three major Western European countries the number of persons employed in manufacturing was lower in 1986 than in 1982, even though the rate of capacity utilization was higher. The decline in employment was sharper in France (10.5 per cent) than in the United Kingdom (7.3 per cent) and the Federal Republic of Germany (2 per cent), where capacity utilization rose faster. On the contrary, in the United States

61 *OECD Economic Outlook*, No. 40, December 1986, p. 40.

Table 19

INDEX NUMBERS OF EMPLOYMENT IN MANUFACTURING IN MAJOR OECD COUNTRIES

(1980 = 100)

Country	*1982*	*1984*	*1986*
United States	92.6	95.5	94.6
Japan	101.8	103.1	105.7
France	93.8	88.4	83.9
Germany, Federal Republic of	94.1	89.3	92.2
United Kingdom	86.1	81.4	79.8

Source: OECD, *Main Economic Indicators* (various issues).

and Japan, where recovery in the rate of capacity utilization in manufacturing was comparable to that of the Federal Republic of Germany but the rate of growth of capital stock higher, employment increased.

The decline in employment in Western European manufacturing does not solely, or even necessarily, indicate continued labour shedding and capital deepening. For any given rate of growth of gross capital stock, the increase in productive capacity and net capital stock will be smaller, the faster the rate of scrapping. Scrapping may arise not only from changes in relative prices but also from accelerated obsolescence due to technical progress and more favourable tax provisions and depreciation allowances. It has, for instance, been estimated that in the United Kingdom the net capital stock in manufacturing contracted by around 3 per cent between 1979 and 1985, and the rate of growth of net capital stock was negative every year during 1983-1985. Capital deepening has slowed substantially since 1981, after a rapid growth in capital per employee from 1979 to 1981.[62] Thus, the decline in net capital stock due to insufficient investment, in combination with growth in labour productivity, explains much of the rise in unemployment.

Thus, despite dramatically improved "supply-side" incentives, and the restoration of many "supply-side" variables to levels that had previously been consistent with rapid growth, the expected private sector response has not been forthcoming. Increased profitability and favourable cost conditions may be necessary for higher investment and employment, but they are not sufficient; the pace of investment depends on demand, as well as on costs and profitability. When profitability is high enough firms respond to an increase in demand by increasing production rather than by raising prices. When this raises capacity utilization beyond "normal" levels, investment is adjusted and capacity enlarged. However, this is not what is happening. Despite four years of "recovery", the gap between actual and potential output has not been closed and rates of capacity utilization in manufacturing are below their peak levels of 1979-1980; the slack is even greater in comparison with the peaks attained in 1973 (table 20). In some countries, notably Japan and the Federal Republic of Germany, capacity utilization has declined further during the first quarter of 1987 due to swings in their export volumes. A recent survey of business expectations in EEC countries indicates that the balance of respondents expecting capacity to be more than sufficient to meet expected demand is 18 per cent in the Federal Republic of Germany, 23 per cent in the United Kingdom and 32 per cent in France.[63]

Under present conditions firms are not inclined to invest to expand capacity; expansion

62 Bank of England, *Quarterly Bulletin*, June 1986, pp. 237-240.

63 *European Economy*, Supplement B, 2/1987, table 6.

Table 20

CAPACITY UTILIZATION RATES IN MANUFACTURING IN MAJOR OECD COUNTRIES

(Per cent)

Period	*United States*	*Japan* [a]	*France*	*Federal Republic of Germany*	*United Kingdom*
Peak 1973	87.7	100.0	86.1	88.1	90.6
Trough 1975	70.3	76.5	69.4	74.8	75.5
Peak 1979-1980	87.2	91.6	82.5	85.9	87.6
Trough 1982-1983	68.2	78.7	77.0	74.3	73.0
Peak 1985-1986	80.2	86.9	80.6	85.1	87.4
1986 IV	79.9	80.4	79.0	83.8	86.0

Source: OECD, *Main Economic Indicators* (various issues); Commission of the European Communities, *European Economy*, Supplement B (various issues); *Monthly Statistics of Japan*, Statistics Bureau, Management and Co-ordination Agency (various issues).

[a] Historical peak = 100.

would enlarge the gap between actual and potential output, lower final sales prices relative to input costs and increase the user cost of capital per unit of output, and thereby lower profitability and the rate of return. Higher investment could, in theory, generate the demand needed to absorb the additional capacity, but in a market economy, where decisions are unco-ordinated, a process of spontaneous investment-led growth is unlikely to take place, particularly when governments steer clear of managing demand and the overall pace of economic activity. In the absence of strong demand growth firms are restricting their investment to that needed for rationalization, increasing efficiency and reducing current labour and material costs in order to maintain their market shares and profitability. This serves to increase productivity, but it does not reduce unemployment or add to potential output and growth.

While demand deficiency appears to be the major influence in depressing the pace of capital formation and capacity expansion there are also others. There is no doubt that sharp swings in exchange rates and trade balances, interest rates and economic activity, and uncertainties regarding protectionism since the late 1970s, have served to increase the risk of business investment. This has, in turn, tended to raise the required rate of return.

High interest rates tend to impede investment not only by raising the required rate of return but also by forcing firms to restructure their balance sheets, particularly in countries with highly indebted corporate sectors. As has already been pointed out, the increased indebtedness of firms during the 1970s rendered them extremely vulnerable to rises in interest rates from 1979 onwards. Firms have tended to divert increased flow of profits from investment in physical assets to servicing and reducing debt. While this restructuring of balance sheets was necessary to a certain extent, the need to reduce indebtedness has been greatly enhanced by the persistence of abnormally high interest rates.

It would be counter-productive to try to reduce the gap between realized and required rates of return by raising the former through further shifts in relative prices and incomes. Further declines in real wages relative to productivity not only may require an increase in unemployment, but also could reduce aggregate demand and hence widen the deflationary gap. Similarly, further declines in material input costs would exacerbate the problems of both

the oil and non-oil commodity sectors and serve to intensify deflationary pressures in the world economy. Even in countries where the rate of return in manufacturing is low, notably the United Kingdom, further rises should be sought in the context of expansion and faster growth of labour and capital productivity.

However, the profitability gap, if and where it exists, is best reduced by lowering the required rate of return. It is thus necessary to lower interest rates substantially. In countries where corporate taxes are still high, further reductions may also be helpful. Equally important is the need to reduce the risk component of the required rate of return and increase predictability. Since high rates of return are not good substitutes for deficient demand, increased stability and predictability ought to be sought in the context of expansion. This would require a major revision in the stance of monetary and fiscal policies, particularly in the surplus OECD countries. To take advantage of the improvements on the side of profitability and inflation, monetary and fiscal expansion must give a sufficient impetus to improve investors' expectations regarding market growth. Unless overall OECD demand grows at a considerably faster pace and is distributed so as to reduce the trade imbalances, shifting deflationary pressures from one country to another is likely to continue to deter investment and growth everywhere.

C. Savings and investment in developing countries

The worsened terms of trade, increased debt servicing and reduced flows of external finance during the 1980s have required the developing countries to make a rapid and large swing in their trade balances. The necessary balance-of-payments adjustment has, in general, given rise to a substantial decline not only in domestic absorption but also in the pace of growth. Per capita consumption has declined as per capita incomes have fallen and production has been switched to foreign markets. Nevertheless, the burden of adjustment has fallen mainly on investment, since in many countries the structure of trade and production has prevented reduced consumption from being fully reflected in increased exports. Large cuts in import levels have thus been necessary to accommodate the tightened external constraint. Since they have mainly consisted of essential inputs and capital goods, such cuts have reduced the degree of utilization and pace of expansion of productive capacity. In some countries investment cuts were also necessary to release goods for foreign markets. Thus, investment and growth have been reduced even in countries where exports expanded.

After many years of intense efforts and sacrifices, developing countries have been unable to improve their growth prospects. Many now have higher external debt in both nominal and real terms (i.e. in terms of their export prices) than in 1982, despite the substantial transfer of real resources they have made since that year. Moreover, with the exception of a few, the balance-of-payments constraint has not been reduced. As a result, it is now recognized that there is a need to replace deflationary adjustment by "adjustment with growth". Nevertheless, official thinking has continued to give little or no attention to the need to improve the overall trading and financial environment. Rather, the emphasis is placed on domestic policies designed to increase self-reliance and to improve the quality of investment.

While there can be little doubt that increased efforts are needed to mobilize domestic resources for growth in developing countries, there are severe constraints on the scope and effectiveness of the often recommended measures to boost savings and investment. For one thing, resumption of growth is necessary for increasing domestic savings, although it may not be sufficient if appropriate financial policies are not pursued. It is not easy to reverse the causality between income and savings, particularly in view of the fact that per capita incomes and consumption have already been depressed to levels that endanger social peace, often by worsening the distribution of income.

Secondly, financial stability is difficult to attain when the external balance remains seriously disrupted. External financial difficulties impinge directly on the ability to increase domestic resources, and policies designed to redress external imbalances often impair the

capacity of both private business and the public sector to increase savings.

Finally, the inefficiency of the financial intermediation process, stemming from the structural deficiencies in the financial sector of developing countries, tends to nullify or even reverse the impact of orthodox policies on the volume and allocation of savings. Unless a certain degree of development is reached and the balance of payments ceases to be a major constraint on economic activity, financial deregulation may be destabilizing.

The following sections will examine these aspects of the question of how to raise the volume and improve the allocation of domestic resources in developing countries. The conclusions that emerge are:

- Many developing countries have an extremely fragile financial system, characterized by the predominance of short-term over investment finance; highly liquid assets; underdeveloped capital markets; and the corporate sector's excessive reliance on debt rather than equity finance. When interest rates are raised, these structural deficiencies, together with inflationary pressures, tend to adversely affect the volume and allocation of existing savings.
- Over the short term there may be some scope to improve the allocation (though not the volume) of existing resources, by increasing the availability and reducing the cost of finance to export and import substitution activities and by strengthening the internally generated savings of such sectors by means of appropriate exchange rate policies, selective credit subsidies and tax relief.
- Over the long term, substantial improvements need to be made in the financial system. This calls for structural policies designed to improve corporate finance, increase the availability of long-term securities, and enhance the efficiency of the banking system.
- Government finance and savings have been hard hit during the 1980s by increased domestic and external debt-service obligations, reduced income tax base, reduced revenues from international trade taxes and increased subsidies to the corporate sector as a result of widespread financial rescue operations. Little increase in government savings can be expected unless these difficulties are overcome. Nevertheless, there is some scope for increasing the efficiency with which public administration and State economic enterprises are operated and revenues are collected and allocated.
- While such policy reforms would help increase the volume of domestic resources over the longer term, they would not be an adequate substitute for an improved external environment. Since there is often a strong complementarity between domestic and imported capital goods, the scope for increasing investment depends on the extent to which the foreign-exchange constraint is reduced; unless that is done an increase in savings effort will have little or no effect on growth (as shown in Annex 6).
- The scope for increasing imports of capital goods by compressing other imports is extremely limited for most countries. Non-essential consumption goods imports have already been cut to a minimum in a large number of countries, and cutting intermediate goods imports would impair the ability to operate and maintain existing production capacities since domestic substitutes are lacking in many countries. Thus, reducing the external constraint on investment and growth requires increased availability of foreign exchange; this, in turn, calls for a faster growth of markets for the exports of developing countries and increased external finance to complement domestic savings efforts.

1. *Salient features of the financial system in developing countries*

The mobilization of savings means increasing savings held in domestic financial assets and institutions, which allows an increase in the volume of resources available from the financial system. It can result either from diverting a greater part of existing savings to the domestic financial system or from additional savings (or a combination of the two). The policy advice to developing countries has typically included raising interest rates to levels that offer savers a positive return on their financial assets. In recent years deregulation and liberalization of financial markets have been advocated as a means for mobilizing resources, both domestically and internationally, allocating credit to its most productive uses, and providing a stable financial environment.

While savings and investment as a proportion of domestic income tend to be higher in countries where per capita income is high and rising, interest rates do not appear to have a systematic influence on either savings, investment or growth. While some studies found

positive effects of real positive interest rates on savings in developing countries, others produced evidence of negative or statistically insignificant effects.[64] For instance, a recent study in IMF on the average relationship between the level of real interest rates and various macroeconomic variables for 64 developing countries has found, contrary to the conventional wisdom, statistical evidence implying that the level of real interest rates has little impact on the rate of growth of real GDP, the rate of growth of real financial assets, savings/income and investment/income ratios and the incremental output/capital ratio. However, the absence of conclusive evidence does not mean that interest rates do not matter, but rather that their impact depends on a host of factors, including the underlying financial structure, the degree of financial stability and the whole range of economic policies.

The financial system serves the purpose of transferring financial resources from surplus sectors, where savings exceed investment, to deficit sectors, where the opposite is the case. In developing countries the non-corporate sector (including households, unincorporated farm and non-farm business) is, in general, the only surplus sector and it accounts for a very large part of total domestic savings (table 21). The main areas of investment by this sector are housing construction and, to a lesser extent, machinery and tools, livestock and farm and non-farm inventories. It can be estimated that the non-corporate sector accounts for less than a quarter of total gross domestic capital formation; it is around 10 per cent in the Congo, Côte d'Ivoire, Nigeria and Pakistan and between 15 and 25 per cent in Colombia, Ecuador, India, Republic of Korea, Philippines, Sri Lanka and Turkey. In some developing countries there are specialized credit agencies or banks which provide finance to farmers and artisans. However, in general, non-corporate finance (in particular mortgage and building societies and consumer credit) is underdeveloped. Consequently, the bulk of non-corporate investment is self-financed; in some countries the informal financial sector also plays a major role in financing unincorporated business as well as households.

The surplus of the non-corporate sector exceeds two-thirds of its savings in many developing countries. The way in which this surplus is transferred to deficit sectors (including the corporate sector and government) depends on the availability of financial instruments and institutions as well as on the risk and return structure of financial assets. Between 60 and 75 per cent of total savings of the non-corporate sector are held in claims on monetary institutions, in the form of currency and sight and time deposits, i.e. in highly liquid forms.[65] The maturity of time deposits tends to be very short and withdrawal is barely restricted. In some countries banks accept time deposits for periods as short as one month or make monthly interest payments on 3, 6, or 12-month deposits; in Turkey, for instance, almost half of total time deposits in 1985 were in one-month and three-month accounts. The degree of concentration of deposits in a small number of accounts is also very high; in the same country in 1985 about half of the total time deposits were held by 6 per cent of the total number of account holders.

In some countries (e.g. India, Malaysia, Egypt, Philippines, Sri Lanka and Turkey) compulsory provident and pension funds constitute an important part of household savings. Particularly in countries where the social security systems are young, the surpluses of these institutions amount to 10-25 per cent of total household savings (about 23 per cent in India, 17 per cent in Turkey and 11 per cent in the Philippines) and more than 2 per cent of GNP. Other non-bank financial institutions, such as investment and development banks, savings and mortgage loan institutions, post office savings institutions, building and loan associations and life insurance companies remain undeveloped in the majority of developing countries. Thus, the share of banks in total domestic credits of financial institutions (excluding provident and pension funds) is very high, exceeding 90 per cent in many developing countries and instruments in the form of claims on non-bank financial institutions remain inadequate (table 22).[66]

The share of direct securities (i.e. equities and public and private sector bonds) in total

64 For a survey of the empirical evidence see K.L. Gupta, *Finance and Economic Growth in Developing Countries* (London: Croom Helm, 1984), chap. 2.

65 K.L. Gupta, *op. cit.*; and Y. Akyüz, *Financial Structure and Relations in the Turkish Economy*, The Industrial Development Bank of Turkey, Istanbul, 1984, and the works cited therein.

66 The figures in these two paragraphs are based on Felipe Morris, *India's Financial System. An Overview of its Major Structural Features*, World Bank Staff Working Papers, No. 739, Washington, D.C., 1985; Christine Wallich, *Savings Mobilization through Social Security. The Case of Chile, 1916-1977*, World Bank Staff Working Papers, No. 553, Washington, D.C., 1983; Akyüz, *op. cit.*; R.W. Goldsmith, *Financial Structure and Development*, Yale University, 1969, tables 5.22 and 5.23; Arvind Virmani, *Government Policy and the Development of Financial Markets. The Case of Korea*, World Bank Staff Working Papers, No. 747, Washington, D.C., 1985, p. 78; Asian Development Bank, *Capital Markets in the Asia-Pacific Region*, Manila, 1986, p. 109; and F. Revilla, "Savings for Development: The

Table 21

SECTORAL DISTRIBUTION OF SAVINGS IN SELECTED DEVELOPING COUNTRIES [a]

(Per cent of GNP)

Country	*Year*	*Non-corporate*	*Corporate* [b]	*General government*
Argentina	1984	19.5	-5.8	-1.0
Brazil	1984	22.7	-1.2	-3.7
Chile	1984	9.6	1.0	-7.0
Colombia	1984	9.8	7.0	-1.2
Mexico	1984	16.9	9.4	-1.8
Peru	1984	9.0	6.8	-1.3
Venezuela	1984	21.8	-11.7	14.9
India [c]	1983	14.9	0.7 [d]	2.2
Philippines [e]	1981	5.9	5.0	3.9
Republic of Korea	1984	9.8	10.1	7.6
Thailand	1980	11.3	8.6	0.7
Turkey	1981	11.7	1.5	6.8
Congo	1981	4.8	15.2	21.6
Côte d'Ivoire	1979	4.4	2.6	8.5

Source: UNCTAD secretariat estimates based on: United Nations *Yearbook of National Accounts 1982*; United Nations, *Statistical Yearbook for Latin America and the Caribbean 1985*; national statistics and country studies; and Inter-American Development Bank, *Economic and Social Progress in Latin America, 1985 Report*.

a Gross national savings, unless otherwise indicated.
b Including State and private corporate and quasi-corporate enterprises, unless otherwise indicated.
c Net domestic savings (as per cent of GDP).
d Excluding State enterprises, which are included in General government.
e Net national savings.

financial instruments is particularly low, less than half the share in most developed market economies; it is around 10 per cent in India, 20 per cent in Nigeria and Turkey, and 25 per cent in Thailand and the Republic of Korea. The share of direct securities in non-corporate financial savings is even lower; they are mostly issued to financial institutions and non-financial corporations. For instance, it has been estimated that in India in 1980-1981 only about 6 per cent of financial savings of this sector was directly mobilized by the corporate sector. A little less than a third of equity shares of all companies in India are held by individuals, while financial institutions and joint stock companies hold about a half. In Peru financial institutions hold two-thirds of the stock of bonds. In Turkey bonds and equities constitute only about 15 per cent of total financial savings of the non-corporate sector. Even in countries where direct securities account for a relatively greater part of total financial instruments (e.g. the Republic of Korea), the non-corporate sector absorbs less than half of the direct security issues. As firms are owned by families, shareholding is extremely concentrated; for instance, in the Republic of Korea less than 1 per cent of the total number of shareholders own about 57 per cent of total shares, whereas 61 per cent own 2 per cent. In some countries government bond issues have recently increased in relative terms as the financing of budget deficits has been shifted from the Central Bank and external sources to domestic financial markets, but direct security issues by the corporate sector remain small.

While bank deposits continue to be the main domestic financial instrument of saving for the non-corporate sector in developing countries, gold and foreign-exchange assets can be an important alternative. Although statistical evidence is lacking, it is known that private gold holdings exceed the official reserves by a

Case of Peru", *United Nations Report of the Third International Symposium on the Mobilization of Personal Savings in Developing Countries* (ST/ESA/171), 1986.

Table 22

PERCENTAGE SHARE OF THE BANKING SYSTEM IN TOTAL DOMESTIC CREDITS OF FINANCIAL INSTITUTIONS IN SELECTED DEVELOPING COUNTRIES

(1983-1985 averages)

Country		*Country*		*Country*	
Guatemala	98	Zimbabwe	92	Ethiopia	77
Zambia [a]	96	India [a]	92	Peru	73
Costa Rica	95	Ecuador [a]	88	Kenya	69
Egypt	94	Republic of Korea	85	Mexico	64
Thailand	94	Tunisia	81	Malaysia	58
Turkey	93	Morocco [b]	79	Colombia [a]	52
Malawi	93	Philippines	79	Venezuela	48
Jordan	93	Honduras	78	Brazil	43
Jamaica	92	Paraguay	77		

Source: IMF, *International Financial Statistics* (various issues).
a 1983-1984.
b 1983.

multiple of several factors in a number of developing countries. In countries where foreign-exchange restrictions are applied, holdings are either in currency or in interest-bearing assets abroad. In others, where residents are allowed to hold foreign-exchange deposits with resident banks, such holdings are again, partly or largely, in the form of highly liquid claims on domestic monetary institutions.

In some developing countries (e.g. Colombia, Mexico, Peru, Republic of Korea, the Philippines and Thailand) corporate savings (undistributed gross profits) are a major source of corporate investment. However, in general, corporate investment exceeds savings by a large margin; for instance, in the early 1980s the deficit of the corporate sector as a proportion of GNP was about 3.5 per cent in Colombia, 7 per cent in Thailand, 9-10 per cent in Ecuador, Côte d'Ivoire and Peru, 14 per cent in Turkey and 16 per cent in the Congo. State economic enterprises have deficits not only on capital account but, in a number of countries, also on current account. These deficits are financed through transfers from the central government budget, the surpluses of social security institutions, central bank credits and external borrowings; in general, for State economic enterprises access to commercial bank credits is limited and direct security issues to the public are unimportant.

Private firms are heavily dependent on credits from domestic banks. Firms borrow not only to finance investment but also to build up operating capital. Bank credits constitute a very large proportion of total liabilities of the sector and stand at very high ratios vis-à-vis bonds and equities; they account for more than 80 per cent of total corporate debt in many developing countries. The debt-equity ratio is very high, of the order of 3 or 4:1, even in countries where equity finance is relatively more advanced (e.g. the Republic of Korea). Large firms often have easy access to bank credits due to their control over or ownership of commercial banks. Issuing direct claims such as bonds tends to be more costly than bank credits and the paper is difficult to market. Equities are not widely issued to the public

in part because the owners prefer to retain control.

A large proportion of total commercial bank credits is short-term, and there is a paucity of long-term financing. It has been noted that in Asian countries "commercial and development banks have facilitated private firms' access to their funds by tolerating high corporate debt-to-equity ratios and company debt structures that are heavily weighted towards the short term ... Consequently, many DMC (Developing Member Countries) companies, particularly those in the Republic of Korea, the Philippines and Thailand, have become financially vulnerable in the wake of the recent economic downturn."[67] Some countries, such as the Republic of Korea, have begun to establish specific debt/equity guidelines for loans from government-owned development finance institutions and commercial banks; however, such guidelines are not always strictly enforced. In Latin America the corporate sector is said to have reacted to the shortage of investment credits "by restricting the distribution of profits, by repeatedly renewing short-term bank credits and, in the case of the larger enterprises, by going directly to external sources of financing".[68] In many countries efforts to encourage banks to lend at longer term have not been successful. Banks are sometimes legally required to extend investment credits to preferred sectors, but efficient supervision is often lacking; renewed short-term credits or non-performing loans are often reported as investment credits. Specialized public or semi-public investment banks help fill the need for longer-term credits, but these institutions have limited resources; they rely on funds from abroad, social security systems and central banks and government budgets, and are often unable to raise funds in domestic markets through direct issues of long-term securities.

The central government is also a deficit sector, although if allowance is made for transfers to State economic enterprises, its deficits would be substantially lower in some countries. Budget deficits are financed in different proportions by external borrowing, central banks and bond issues. In some countries government bonds are found attractive by non-financial firms because they can be used as collateral. Banks are sometimes required or encouraged to hold government bonds as part of their disposable assets (as distinct from reserves). Again, in some countries, social security surpluses are partly or largely invested in government bonds.

In many developing countries financial activities outside institutional and regulated finance (i.e. the so-called informal financial sector) play a major role. There are broadly two types of activities in this sector; lenders operating with their own capital, and unlicensed private bankers and brokers which also collect funds. The former antedate institutional finance and are widespread in rural areas, particularly in Africa and Asia, where moneylenders are often landlords and merchants; although credit-in-kind is still practised, these activities have been increasingly monetized. Moneylenders also have easier access to bank credits than their debtors; these funds are used to supplement their own capital and are lent at substantially higher interest rates. In many countries pawnshops are also an important part of the informal sector although in some (e.g. Indonesia) they are government-owned. Another institution in the informal sector is the mutual savings unit (rotating savings and credit associations) which pools and allocates small savings among its members. In all these activities lending is short-term and in small amounts, and the main borrowers are households and unincorporated farm and non-farm business.

Unlicensed private bankers and finance companies are widespread in a number of countries (e.g. India, Malaysia, Republic of Korea, Thailand and Turkey) and operate largely in urban areas. They collect deposits by issuing bills and papers; they are also known to collude with banks to provide complete repayment guarantee to lenders (as in the Republic of Korea) and market such instruments as certificates of deposits (CDs) at interest rates above official ceilings (as in Turkey).[69] Interest is often paid to deposit holders on a monthly basis and they offer much higher rates than the commercial banks. Borrowers also include corporate firms which do not have easy access

67 *Capital market developments in selected developing member countries of the Asian Development Bank* (Manila, Asian Development Bank, 1985), pp. 34-44.

68 ECLAC, *Latin American and Caribbean Development: Obstacles, Requirements and Options* (LC/G.1440 (Conf. 79/3)), Special Conference, Mexico City, 19-23 January 1987, p. 45.

69 Collusion with banks can take various forms. For instance, banks loan the CDs to brokers at a premium who then sell them to the public at a discount and use the funds to lend at curb rates. The holder of the CDs has a claim on the bank; the bank on the broker; and the broker on its debtors. Alternatively, brokers can bring together banks, borrowers and lenders. The lender places a deposit at the bank at regulated interest rates but acquires a claim on the broker for the difference between the curb and regulated interest rates. The borrower takes a loan from the bank at the regulated rate but issues an additional liability to the broker to meet the difference between the curb and bank rates. The bank blocks part of the loan to raise its effective lending rate.

to bank credits; for instance, it has been estimated that in the Republic of Korea in 1969 about 80 per cent of such lending was to the urban business sector.[70]

2. *Interest rate and financial policies*

This fragmented system of finance in developing countries is typically characterized by the absence of a correlation between financial and aggregate savings and, more importantly, between financial savings and productive investment. Increases in financial savings do not always represent an increase in the aggregate volume of real savings; they often represent a greater concentration of savings in financial assets as a result of shifts from other forms of savings and even a decline in productive investment. Moreover, increases in financial savings are not always accompanied by improvement in their allocation and use; in many developing countries the financial system does not channel savings towards productive investment efficiently. These structural shortcomings, together with financial instability, result in a shortage of long-term financing which not only undermines capital formation but also shortens the time horizon of investors, and tends to direct the funds into short-term speculative investments with quick pay-offs.

In some developing countries excessively loose monetary policies, high rates of inflation, strongly negative real interest rates and lack of financial discipline have helped to perpetuate this situation. Thus, economic policy has in some countries aggravated the inherent structural shortcomings of the financial system stemming from the low level of economic development attained, the maldistribution of income and wealth, and the inefficiency of private and public enterprises. However, when not accompanied by extensive financial reforms to attain a structural transformation and by efforts to increase financial stability, attempts to reverse this situation by means of deregulation of financial markets and sharp rises in interest rates have often resulted in serious financial difficulties, reduction of aggregate real savings and increased inefficiency in the allocation of resources.

In a developing country with serious balance-of-payments difficulties, a high rate of inflation, and stagnant or declining per capita income, a rise in interest rates on domestic financial instruments (in particular bank deposits and government and private bonds) fails to exert a strong influence on the propensity to save. It tends rather to redistribute existing savings, and to redistribute income from debtors (mainly the corporate and government sectors) to creditors (i.e. rentiers in the non-corporate sector). The influence of higher interest rates on the volume and allocation of savings is often exerted through these routes.

When interest rates are raised substantially as part of a stabilization policy or as a result of deregulation, a shift often occurs into interest-bearing financial assets from other forms of holding wealth (such as inventories, housing, funds in informal markets, cash and non-interest-bearing deposits, and gold and foreign-exchange assets). Such shifts are not neutral in their effects on the allocation of aggregate savings and on other macroeconomic variables.

There is a widespread belief, implicit in much of the literature, that commodities are widely *held* as alternatives to financial assets as a form of wealth so that a rise in interest rates in real terms would entail a shift to financial assets. This impact of changes in real interest rates on the form of wealth holding is quite distinct from its possible impact on the propensity to save. There is no evidence that such commodity holdings are important in the household sector. However, a rise in interest rates would certainly have an impact on inventory holdings in corporate and non-corporate business; it would reduce the inventory investment and deficits of these sectors.

A similar but more important influence is on housing investment; in many countries housing construction is one of the first industries immediately hit by increased interest rates. An individual can shift out of housing to financial assets in secondary markets, but society as a whole can only do so by reducing its new aggregate investment in housing. This will increase the surplus of the household sector and the part of existing savings held in financial assets.

When interest rates in institutional and regulated markets are raised so as to close the gap with the curb rates, an important shift of financial resources often takes place away from the informal sector, particularly where the initial interest rate differentials are large. Given the risk involved in lending activities in in-

70 See Sweder van Wijnbergen, *Interest Rate Management in Developing Countries. Theory and Simulation Results for South Korea*, World Bank Staff Working Papers, No. 593, Washington, D.C., 1983, p. 31.

formal markets, the capital of moneylenders and deposits at private bankers tend to be channelled to banks and direct securities. If the access of informal market borrowers to bank credits is thereby improved, this will result in a decline in their credit costs. However, while lenders have a choice between formal and informal markets the debtors in informal markets often lack access to bank credits. Thus, the shift of funds to the formal sector may result in increased availability of finance to large corporations at the expense of small producers, traders and peasants. This could tend to push the curb rate further, increasing the financial difficulties of debtors in informal markets.

Interest rate changes can also induce portfolio shifts into the type of assets that are often considered as financial savings. When interest rates are raised, particularly on very short-term time deposits, the timing of spending may be adjusted and transaction balances in currency and sight deposits reduced. However, the declines in currency-deposit ratios often observed following sharp increases in deposit rates are only partly due to such substitution; they largely reflect the inflow into deposits from other forms of wealth holding. Such declines raise the rate of credit creation by the banking system unless checked by increased reserve requirements and/or declines in the domestic currency liabilities of the central bank.

Finally, demand for gold and foreign exchange may also be affected by interest rate changes. Indeed, real interest rates are relevant in portfolio decisions not so much because commodities are alternatives to financial assets as because gold and foreign-exchange assets are often hedges against inflation even in countries where foreign-exchange restrictions are tight and the official exchange rate is overvalued. In such cases high interest rates can relieve the pressure on exchange rates and encourage a shift to domestic financial assets. Nevertheless, when balance-of-payments difficulties persist, inflation remains high and the domestic currency is expected to depreciate in real terms, the interest rate increase needed to encourage a shift from foreign to domestic financial assets may be huge, particularly if the external capital transactions are liberalized and world interest rates are high in real terms.

While higher interest rates tend to result in a greater concentration of savings in domestic financial assets, the volume and the use of aggregate savings are not always positively influenced. The adverse consequences of the redistribution of income at the expense of debtors can often offset the benefits that can be expected from higher interest rates. Given high intermediation costs and reserve ratios and allowing for withholding taxes, the cost of credits can substantially exceed the rate of interest on bank deposits. Moreover, for any given real rate of interest on bank deposits, the real cost of finance to business tends to rise with the rate of inflation since, among other things, taxes are levied on total (nominal) rather than real interest incomes. Thus, when interest rates on bank deposits are raised so as to offer a net after-tax real rate of return of 2-3 per cent, the real cost of credits to firms can easily climb to 20-30 per cent if inflation is high (see Box 3). While high inflation could mean substantial holding gains for firms on their financial liabilities, their current profits, cash flows and liquidity positions would be significantly worsened because of very high debt-equity ratios and a high share of bank loans in total debt.

Firms' profits may be protected if increased credit costs can be passed onto prices; the consequent inflationary pressure can be substantial when credits account for a major part of total costs. If money wages are also raised, inflation may be accelerated, requiring further adjustments in nominal interest rates if real rates are to be kept unchanged. If money wages lag behind prices, the decline in real wages may partly offset the impact of high credit costs on profits. If, at the same time, restrictive demand management policies are pursued (as is often the case), the squeeze on corporate profits and cash flows will be tight, even where the burden falls partly on wages. The profit squeeze is often further aggravated by measures designed to redress external balances, in particular currency depreciation; this raises the domestic currency equivalent of firms' external financial obligations and income-gearing ratios, particularly for firms not exporting their output. When monetary policy is tightened, currency depreciated and interest rates raised, the overall impact on the economy will tend to be stagflationary, as has been observed in a number of developing countries (e.g. Argentina, Brazil, Mexico and the Republic of Korea).[71]

A rise in interest rates often increases the demand for "distress borrowing", which in turn puts further pressure on interest rates. Frequently, firms borrow from banks in order to finance their interest payments and incur the danger of a continuously rising debt-equity ratio. This is often the case when there are close

[71] Lance Taylor, *Economic Stabilization. Recent Experience in the Third World* (Helsinki, WIDER, 23-25 August 1986).

Box 3

REAL COST OF CREDITS

In order to illustrate how the real cost of bank credits can substantially exceed the real rate of interest on deposits and increase with the rate of inflation, assume that sight deposits pay no interest and constitute 30 per cent of total bank deposits. A withholding tax of 20 per cent is applied on interest from time deposits. If the rate of inflation is p per cent, the rate of interest that would bring a net real after-tax return of 3 per cent will be $(p+0.03p+0.03)/(1-0.20)$. If the intermediation cost (including charges on credits) is 5 per cent of total deposits, then cost to banks of collecting $100 worth of deposits (i.e. $30 sight and $70 time deposits) will be $5+70(p+0.03p+0.03)/(1-0.20)=7.6+90.1p$. If reserve ratios are 25 per cent on sight deposits and 20 per cent on time deposits then $78.5 of total deposits can be used for credits at an average rate of $(7.6+90.1p)/78.5$ per cent. The cost to borrowers will exceed this amount by 20 per cent due to withholding tax. Thus, the real cost to borrowers will be $[(1.2(7.6+90.1)/78.5)-p]/(1+p)$ per cent. When the rate of inflation is 20 per cent the real cost of credits will be about 16 per cent; if inflation is 100 per cent the cost will rise to 24 per cent. If interest is paid on banks' reserves at the central bank and/or interest payments by the corporate sector are tax deductible, these rates would be somewhat lower; but if banks pay interest on sight deposits they would be higher. Moreover, as inflation increases and the real rate of interest on time deposits remains unchanged, funds would tend to shift from sight to time deposits, thereby raising further the real cost of credits to borrowers.

ties between firms and banks and efficient bank supervision is lacking. If sufficiently widespread, this can lead to a generalized crisis whereby the problem of illiquidity becomes one of insolvency. This, in turn, impairs the viability of domestic financial institutions and results in extensive rescue operations and nationalization of private debt.

A rise in interest rates is unlikely to raise the overall propensity to save when real wages and corporate profits are both declining. On the contrary, increased interest payments from undistributed profits will reduce corporate savings by an identical amount. This is not often compensated by a rise in non-corporate savings, since the nominal part of the additional interest income transferred from corporate profits and savings to rentiers is not entirely saved by the latter. Indeed, when per capita incomes and consumption are falling there is a tendency to liquidate real assets in order to maintain the accustomed levels of consumption. This tendency is often reinforced by high rates of interest on financial assets, which give an opportunity to maintain the nominal value of wealth while providing a regular interest income to support consumption; deposits paying monthly interest incomes are hence found extremely attractive in some countries even when interest rates on such deposits are substantially lower than deposits paying annual interest. Thus, high interest rates can encourage consumption of real wealth by small savers. For any given real rate of interest, the adverse impact on savings will be greater, the higher the rate of inflation and the greater the decline in per capita incomes.

When per capita income is steadily rising and real interest rates are moving towards positive levels due to a decline in inflation rather than a rise in nominal interest rates, aggregate savings tend to be positively influenced. The adverse effects of the redistribution of income between debtors and creditors will be lessened when inflation is substantially reduced, whereas higher real interest rates and rising per capita consumption help to raise savings in the surplus sectors. In other words, given the pace of income growth and the level of real interest rates, aggregate savings tend to be negatively related to nominal interest rates (and hence the rate of inflation) largely through the redistribution effect. It is for this reason that adjustment in real interest rates ought to be sought not so much by raising nominal rates as lowering the rate of inflation.

The available evidence on the behaviour of savings in a number of developing countries is broadly consistent with these considerations (table 23). Three quarters of the countries examined had lower domestic savings rates and one half lower per capita incomes in 1983-1984 than in 1976-1980. While increased per capita incomes did not always result in higher savings rates, there was a close association between lower per capita incomes and lower savings rates. Only one country (Costa Rica) managed to improve its savings performance substan-

Table 23

SAVINGS, INFLATION, INTEREST RATES AND PER CAPITA INCOMES IN SELECTED DEVELOPING COUNTRIES

(Change from 1976-1980 to 1983-1984)

Country	Domestic savings rate	Nominal interest rate [a]	Consumer price inflation	Real interest rate [a]	Per capita income
	Percentage point change				Percentage change
Argentina	-3.0	372.0	322.6	16.7	-10.9
Brazil	-1.0	51.3 [c]	119.1	-20.5 [c]	-2.1
Chile	-2.0	-33.8	-42.6	3.3	-1.5
Colombia	-5.0	2.6 [b]	-6.4	7.6 [b]	4.8
Costa Rica	8.0	15.1 [b]	14.3	-0.1 [b]	-10.6
Ecuador	-2.0	2.0 [b]	27.9	-17.9 [b]	-2.4
Jamaica	0.0	3.1	-3.7	5.4	-7.6
Mexico	5.0	38.3	61.6	-10.5	3.9
Peru	-3.0	37.1 [b]	59.3	-5.3 [b]	-15.5
Uruguay	1.0	24.9	-4.0	18.8	-8.2
Venezuela	-8.0	6.8 [b]	-1.3	7.4 [b]	-20.7
Cameroon	8.0	4.7	3.2	1.5	42.4
Côte d'Ivoire	-2.0	1.2	-12.0	11.5	-11.6
Egypt	-4.0	4.8 [b]	4.2	0.6 [b]	31.3
Ethiopia	-3.0	1.6 [c]	-11.2	10.9 [c]	1.6
Ghana	-2.0	6.4	5.1	1.8	-28.1
Kenya	0.0	7.2	-2.3	8.4	-3.1
Malawi	1.0	9.2	7.8	1.6	-5.2
Morocco	0.0	0.5	-0.5	0.9	-0.6
Nigeria	-16.0	3.9	13.6	-6.2	-26.0
Tunisia	-3.0	2.5	1.8	0.7	12.1
Zambia	-8.0	1.1	4.6	-2.7	-15.6
Zimbabwe	-10.0	8.1	12.5	-3.1	5.8
Bangladesh	-1.0	4.8	1.7	2.8	4.1
India	1.0	1.0 [b]	5.7	-5.3 [b]	10.8
Indonesia	-6.0	3.2	-3.6	5.9	24.5
Malaysia	-1.0	3.3	-0.7	3.8	26.9
Pakistan	-1.0	0.2	-2.1	2.2	18.5
Philippines	-3.0	3.8 [b]	16.6	-9.3 [b]	2.6
Republic of Korea	2.0	-4.8	-13.6	8.0	27.8
Thailand	-4.0	5.7	-7.0	12.3	21.7
Turkey	-2.0	49.6	-6.6	38.7	5.2

Source: UNCTAD Data Base.
a Time deposit rates unless otherwise stated.
b Discount rates.
c Treasury bill rates.

tially despite a decline in per capita income - and it did so without any rise in real interest rates. Almost everywhere nominal interest rates were higher in 1983-1984 than in 1976-1980 and in most countries real interest rates were maintained or increased. Real interest rates declined mostly in countries where both nominal rates and inflation increased substantially. In most countries where nominal interest rates and inflation remained high, domestic savings tended to fall (e.g. Argentina, Brazil, Peru, Turkey and Zimbabwe), including those countries where real rates were raised substantially. In general, savings performance

improved or was maintained in countries where inflation did not accelerate or was reduced and nominal interest rates were kept moderate (e.g. Cameroon, India, Jamaica, Kenya, Malawi and the Republic of Korea), including those where real interest rates fell.

While time series data on sectoral savings are limited, available evidence suggests that in most countries where interest rates were sharply raised, aggregate savings declined largely because of a collapse of corporate (and government) savings. In Brazil corporate savings, as a proportion of GNP, started to decline and remained negative for three consecutive years after 1981, when interest rates were more than doubled. The decline in government savings was even more marked, amounting to over 3 percentage points. There was some improvement in non-corporate savings but aggregate savings fell in 1983-1984 compared to 1980-1981. In Chile the decline in corporate savings during 1980-1981 resulting from interest rate deregulation could only be checked after 1982, when the Government forced the liquidation of several large debtors in order to limit the pressure on interest rates and introduced interest (and exchange) rate subsidies.[72] In Turkey, too, sharp rises in interest rates after mid-1980 reduced corporate savings to negative figures; private savings as a proportion of GNP fell from over 14 per cent in 1980-1981 to under 9 per cent in 1985, despite continued high and positive real interest rates and increased per capita incomes.[73]

The above discussion indicates that increasing domestic savings in developing countries calls primarily for the restoration of growth and financial stability. Since per capita incomes continue to decline and inflation remains high and is even accelerating, the scope for increasing savings at present seems extremely limited. However, as long as the balance-of-payments constraint is not relaxed, attaining both growth and financial stability will remain only a remote possibility.

There is, however, some scope for utilizing existing domestic resources more efficiently so as to help reduce the balance-of-payments constraint. There are, in particular, possibilities for increasing the availability and reducing the cost of finance to export and import substitution activities. The internally generated savings of such sectors can be strengthened by means of appropriate exchange-rate policies, selective credit subsidies and tax reliefs. At the same time, non-corporate savings can be redirected to domestic financial institutions and instruments to finance investment in foreign trade sectors.

Such price and cost incentives need to be accompanied by major institutional reforms. The key areas of improvement are corporate finance and the banking system. In many developing countries there is an immediate need to restore the liquidity and solvency of the domestic financial system and this requires, above all, a restructuring of corporate finance. The dependence on short-term bank credits needs to be reduced by encouraging long-term direct security issues, and the debt-equity ratio should be lowered by means of various incentives to raise the capital base by opening up ownership to the public and separating ownership from management.

It is true that in many developing countries abnormally low rates of interest have been a major factor in increased resort to bank credits at the expense of equity issues. However, high real interest rates on bank deposits also undermine the development of capital markets; given the liquidity and risk advantages of bank deposits, capital market issues may have to offer much higher rates of return, possibly exceeding the real earning capacity of business. Moreover, the cost disadvantage of equity financing is accentuated by the tax deductibility of interest payments which tends to partly offset the high intermediation cost of the banking system. A number of steps are possible: lengthening the maturities of bank deposits; revising the tax treatment of interest and dividend payments and receipts; favouring companies with open shareholding in corporate tax rates and government contracts; encouraging or requiring pension funds to invest in equities; improving the provision of protection to investors; increasing access to information about markets and company balance sheets; and effective supervision of primary and secondary markets. Indeed, it is through such institutional measures that a number of developing countries have substantially strengthened their equity markets.

In many developing countries the privileged access to bank credits of large firms via the interlocking ownership of industrial groups and commercial banks needs to be reduced. Although banking regulations often restrict the

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72 James Tybout, "A Firm-Level Chronicle of Financial Crises in the Southern Cone", *Journal of Development Economics*, No. 24, 1986. For the behaviour of non-corporate, corporate and government savings in Brazil and Chile, see Inter-American Development Bank, *Economic and Social Progress in Latin America, 1985 Report*.

73 Akyüz, *Financial Structure and Relations in the Turkish Economy* (*op. cit.*), and the Central Bank of the Republic of Turkey, *Annual Report 1985*, p. 59, table 1.

size of loans extended to a single firm to a fraction of equity, such restrictions are not always efficiently enforced. Moreover, some developing countries lack effective regulations regarding provisions against non-performing loans. Closing loopholes regarding the definition of bad loans, improving and standardizing accounting procedures and giving central banks effective supervisory power can therefore help to improve the allocation of bank credit.

An important issue here is the extent to which improvements in the financial system should be sought in the context of deregulation and greater reliance on market forces rather than of direct government action designed to generate and allocate financial resources in accordance with a pre-determined industrialization strategy. Experience suggests that greater success has often been achieved when these issues have been approached pragmatically, rather than ideologically, taking into account the inherent strength and weaknesses of market mechanisms, the efficiency and flexibility with which the rest of the economy is operating, the level of industrial development reached, and the degree of vulnerability of the economy to shocks.

The past experience of the Southern Cone countries of Latin America clearly indicates that when inadequate attention is paid to such factors financial deregulation can be highly destabilizing in its effects and lead to a waste of domestic and foreign-exchange resources. The reforms were conceived to end financial repression, to remove government-induced distortions and to ensure financial market equilibrium in the context of increased efficiency of resource allocation. Thus, banks were denationalized, deposit insurance enlarged, interest rates freed, reserve requirements substantially reduced, restrictions on financial intermediation dismantled, and barriers to international borrowing removed. However, as is now widely recognized, these reforms failed to achieve their objectives and gave rise to a number of problems.

Although the reforms encouraged the concentration of savings in financial instruments, aggregate domestic savings was adversely influenced. For instance, in Chile financial assets increased from about 15 per cent of nominal GNP in 1973 to 48 per cent in 1982, whereas aggregate domestic saving fell from over 15 per cent to about 12 per cent.[74] Moreover, financial liberalization did not encourage long-term intermediation; competition among banks was intensified and payments of very high interest rates on very short-term deposits (30 days or current accounts) resulted in a transfer of savings from medium and long-term instruments. This, together with orthodox tight monetary policies, pushed interest rates to very high levels. Non-financial firms ceased to earn operating profits and debt-equity ratios climbed rapidly; for instance, in Argentina corporate equity fell from 60 per cent of total assets in 1970 to under 50 per cent in 1980. This led to intervention in, or liquidation of, 72 financial entities, representing 20 per cent of total deposits. Similarly, in Uruguay 21 out of 23 banks had to be bailed out and sold to foreign banks.[75] In general, the reform experiment resulted in a reimposition of more severe restrictions, subsidized external debt-servicing via special exchange rates, nationalization of private external debt, a *de facto* socialized banking system, and introduction of complete control over foreign borrowing.

By contrast, the reforms beginning in the mid-1960s in the Republic of Korea served to create "a financial system which was to act as a conduit for the accumulation of financial savings and the allocation of credit. At the core of the financial system were a number of specialized banks, owned by the Government, and five commercial banks whose lending was subject to the Ministry of Finance's detailed instructions."[76] The Government thus exercised control over the allocation of financial resources through a set of guidelines under "Regulations in the uses of Funds in the Financial System", and the level and structure of interest rates were effectively administered. Directed or policy loans have been an important feature of the country's financial system. There has been a widespread use of credit rationing and provision of credit subsidies to preferred sectors, including, in particular, those with export targets, with such subsidies amounting to more than 10 per cent of GNP in the 1970s. "Through its allocation of credit to industry, the State also reviewed and directed all major investment by the private sector ... Interest rate subsidies probably constituted the single most important incentive for exports,

74 J.P. Arellano, "De la liberalización a la intervención: el mercado de capitales en Chile, 1974-1983", *Colección Estudios* (CIEPLAN), No. 11, December 1983.

75 C. Fernandez, "La crisa financiera argentina, 1980-1982", *Desarrollo Económico* , April-June 1983; V. Corbo, J. de Melo and J. Tybout, "What went wrong with the recent reforms in the Southern Cone?", *Economic Development and Cultural Change*, April 1986, p. 628.

76 S. Yusuf and R. Kyle Peters, *Capital Accumulation and Economic Growth. The Korean Paradigm*, World Bank Staff Working Paper, No. 712, Washington, D.C., 1985, p. 23.

accounting for as much as a fifth of the total subsidy."[77] Currency convertibility remained restricted: only exporters were permitted to hold foreign currency deposits and all foreign loans were subject to approval and guarantee.

As has been pointed out by many observers, it is difficult to attribute this successful experience to the pronouncement of market liberalization currently being advocated as a crucial instrument for structural adjustment in developing countries: "On balance, the exchange rate, the interest rate ... were not neutral factors subordinate to market forces ...; rather, they were leading indicators and important instruments of developing strategy."[78] It is true that market forces have come to play a greater role in recent years in the Republic of Korea. Nevertheless, even after such a successful phase of industrialization the financial system still remains regulated. While the fifth plan, launched in 1982, formulated a programme of liberalization, including denationalization of banks, reduction of subsidized loans, deregulation of interest rates and financial intermediation, and increased competition and outward orientation of the financial system, so far only the first objective has been fully implemented.

3. *Government savings*

The 1980s have witnessed a substantial decline of government savings in many developing countries (table 24). In a number of countries slower growth reduced the domestic tax base and government revenues as a percentage of GDP. Where foreign trade taxes accounted for a large part of government revenues, cuts in imports and weakening export prices and earnings seriously depressed government savings; for instance, central government tax revenues from international trade fell by more than one third between 1980 and 1984 in Bolivia, Colombia, Ecuador, Guatemala, Jamaica, Paraguay and Venezuela. More recently the collapse of oil prices has exacerbated the budget problem in oil-exporting countries.

On the expenditure side, financial rescue operations increased the claims on the government budget, particularly in countries where serious financial difficulties emerged as a result of deregulation; this was reflected in sharp increases in current transfer payments from the budget (e.g. in Argentina, Chile, Turkey and Uruguay). More importantly, measures taken to deal with the crisis in the external accounts have impaired the capacity of governments to generate public sector savings. Currency devaluation, in combination with sharp rises in interest rates on external debt, has raised the domestic currency equivalent of governments' external financial obligations; internal debt-service obligations have also risen where domestic interest rates have been raised substantially.

Thus, interest payments on domestic and external debt as a proportion of total government revenues have risen substantially, reaching more than 15 per cent in many countries and exceeding even 30 per cent in such countries as Mexico and Peru. In many countries increased interest payments on domestic and external debt have accounted for most or all of the decline in government savings during 1980-1984 (e.g. Brazil, Kenya, Mexico, Morocco, Pakistan, Philippines, Thailand and Tunisia). The decline in savings and drastic cut back in the availability of external finance have resulted in sharp declines in public sector investment in almost all the countries examined. Thus, in a number of countries (e.g. Brazil, Kenya, Mexico, Peru and Uruguay) the share of interest payments in the budget has tended to approach and even exceed that of investment spending.

Governments have turned to domestic markets as the availability of external finance was sharply reduced. In combination with tight monetary policies, this has intensified the competition between the public and the private sectors for domestic resources and exerted further pressures on interest rates, thereby presenting a major dilemma for many governments. As long as the average real rate of interest on domestic and external debt exceeds the rate of growth of real income, the ratio of public debt to GNP will continuously rise even if primary deficits (i.e. total revenues minus total non-interest current and capital spending) remain unchanged.[79] Under these conditions the reduction of the debt/GNP ratio would require substantial primary surpluses. However, if government revenues as a proportion of GNP cannot be raised, the burden is likely to fall further on investment spending; in

77 *Ibid.*, pp. 22-23.

78 Colin I. Bradford, "East Asian 'Models': Myths and Lessons", in J.P. Lewis and V. Kallab (eds.), *Development Strategies Reconsidered*, (New York, Overseas Development Council, 1986), p. 123.

79 The rate of growth of the debt-GNP ratio is given by $(F/D) + (i-p)-g$, where F is the primary deficit, D total debt, $i-p$ implicit (average) real rate of interest, and g the rate of growth of real GNP.

Table 24

CENTRAL GOVERNMENT BUDGET IN SELECTED DEVELOPING COUNTRIES

(Percentage of GDP)

Country	*Year*	*Revenues*	*Expenditures*	*Balance*	*Savings*	*Investment*	*Interest payments* [a]
Argentina	1980	17.2	20.8	-3.6	0.7	4.3	1.7
	1983	14.5	26.3	-11.8	-3.7	8.1	2.3
Brazil	1980	21.2	23.5	-2.3	-0.8	1.5	0.9
	1984	23.7	27.8	-4.1	-3.0	1.1	2.7
Chile	1980	34.6	29.1	5.5	10.1	4.6	0.8
	1984	31.6	34.6	-3.0	1.5	4.5	1.3
Mexico	1980	16.0	19.1	-3.1	1.6	4.7	1.8
	1984	17.3	24.7	-7.4	-4.1	3.3	8.9
Peru	1980	20.5	23.4	-2.9	2.4	5.3	4.3
	1984	16.2	21.3	-5.1	-1.1	4.0	5.0
Uruguay	1980	16.2	16.1	0.1	2.0	1.9	0.3
	1984	13.5	18.8	-5.3	-3.6	1.7	2.2
Venezuela	1980	24.7	25.1	-0.4	8.4	8.8	1.7
	1984	28.5	25.8	2.7	8.7	6.0	3.1
Cameroon	1980	17.0	16.5	0.5	6.0	5.5	0.1
	1984	24.9	23.2	1.7	10.9	9.2	0.6
Egypt	1980	47.1	53.5	-6.4	9.0	15.4	2.7
	1984	39.5	49.2	-9.7	-2.4	7.3	3.6
Kenya	1980	24.9	29.8	-4.9	2.8	7.7	2.0
	1984	22.8	28.3	-5.4	-1.7	3.7	4.4
Morocco	1980	24.9	35.2	-10.2	0.5	10.7	2.5
	1984	25.3	31.7	-6.4	0.2	6.6	4.2
Tunisia	1980	32.2	35.0	-2.8	9.2	12.0	1.4
	1984	37.0	42.0	-5.0	8.7	13.7	2.5
India	1980	13.0	19.9	-6.9	0.0	6.9	1.8
	1984	14.4	22.7	-8.4	0.3	8.7	2.7
Pakistan	1980	16.8	22.4	-5.6	1.8	7.4	2.0
	1984	17.4	23.6	-6.2	-0.3	5.9	3.2
Philippines	1980	13.0	14.3	-1.3	3.8	5.1	0.9
	1984	10.3	12.2	-1.8	2.5	4.3	1.9
Rep. of Korea	1980	18.1	20.3	-2.2	2.9	5.1	1.1
	1984	18.8	20.0	-1.2	3.3	4.5	1.3
Thailand	1980	14.8	19.7	-4.9	0.1	5.0	1.5
	1984	16.1	19.6	-3.5	-0.4	3.1	2.5
Turkey	1980	20.5	24.0	-3.4	2.9	6.3	0.6
	1984	15.0	24.9	-10.0	-4.4	5.6	2.1

Source: IDB, *Economic and Social Progress in Latin America, 1986 Report*; IMF, *Government Financial Statistics Yearbook 1986*.

a Domestic plus external.

many countries the scope for substantial cuts in current (non-interest) spending is limited, since population is rising fast and living conditions continue to deteriorate.

An increase in interest payments by government implies a corresponding decline in its savings. When such payments are made abroad, the volume of aggregate investment that can be financed by domestic savings will be reduced. Domestic interest payments, on the other hand, represent a transfer of income from the budget to the private sector. If the income so received is saved, it can compensate for the decline in government savings. How-

ever, this is often not the case, since some of the income is devoted to private consumption.

Thus, the public sector in developing countries faces the task of improving its savings and investment performance. Reorganization of public sector finances should aim at alleviating the burden of adjustment on the poorer strata of the population, while improving the growth potential of the economy by increasing the efficiency of operation of the public sector. On the expenditure side, current spending other than on social services should not be allowed to grow in real terms, and efficiency needs to be enhanced through reforms in public administration. Serious consideration has to be given to lowering military spending, particularly in those countries where it has been overprotected in the recent retrenchments. Moreover, subsidies to certain productive activities could be gradually reduced alongside efforts to strengthen and restructure industry.

Some countries have resorted to privatization of parastatals in order to improve their efficiency and acquire resources for the budget. Others have issued claims against incomes of profitable public enterprises which operate on a commercial basis. While a transfer of property rights results in a once-for-all increase of government revenues, the issue of such claims would increase current revenues at the expense of future ones. In both cases the impact on the efficiency of resource use and the aggregate volume of domestic resources remains uncertain and varies from one country to another. Thus, many countries have sought to improve the efficiency of parastatals by reducing excessive use of labour, capital and material inputs, and the underutilization of capacity rather than by privatization.

In many developing countries it is necessary to revise the tax system not only to increase government revenues but also to exert a positive influence on the allocation of resources and distribution of income, and to increase work, savings and investment efforts. The present tax systems are generally far from achieving these objectives and highly fragmentary, and the administrative apparatus is often unable to control the size and incidence of taxes.

In many cases the main need is to reduce the number of tax instruments, concentrating on those that can generate revenue and bring about the desired allocative and distributional objectives. The value added tax is one possibility. Although it is difficult to administer, and hence may not suit countries at a less advanced stage of development, it is a viable option for others. Indeed, some countries (e.g. Turkey) have successfully adopted it in combination with mechanisms that encourage the recording of economic activities and thereby discourage tax evasion.■

Part Two

TECHNOLOGY, TECHNOLOGY FLOWS AND INTERNATIONAL COMPETITIVENESS

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INTRODUCTION[80]

A. Objectives

Technology, after having been considered by economists as late as in the 1950s to be a residual factor in explaining the growth of output, has come to be universally recognized as fundamental to economic growth and development. Since the pace of technological progress differs and its diffusion is unevenly distributed across countries, technology is also a determinant of the evolution of international economic relations. Not long after an idea has been appropriated by its inventor and has been transformed into a new or improved product or process, it also becomes the object of trade in goods and services and in technology itself, through direct foreign investment, capital goods exports, licensing of patents and know-how, or in other forms. Technology is, therefore, linked closely to both the direction and composition of international trade and to the process of economic development, the two cornerstones of UNCTAD. Over the past two decades, the subject of technology has come to form an integral component of the fundamental issues analyzed and negotiated in UNCTAD, as exemplified by the ongoing negotiations on the international code of conduct on transfer of technology.

More recently, UNCTAD has begun to analyze what the technological and related economic changes taking place in the North mean for the trade prospects of developing countries. One way in which technological developments are having repercussions on such prospects is through their influence on global competition between industrialized countries in the sphere of trade. Not surprisingly, developing countries, as a group, find themselves once more to be spectators over events that they are powerless to control. The purpose of Part Two of this Report, accordingly, is to contribute to better understanding, particularly among developing countries, of trade competitiveness and the role of technological innovation and technology transfer.

The current intensification of concern over this subject is reflected in the policy pronouncements of governments with widely different economic philosophies. Three major developments underly this growing concern and are contributing to uncertainty over the future of international economic relations. First, the world economy is passing from a period of unprecedented economic growth to one of comparative stagnation, persistent unemployment and, for some countries, absolute declines in living standards. As each country attempts to adjust to structural change according to its own perceived best interests, international tensions have mounted. Secondly, the advent of the microchip is changing profoundly the way in which goods and services are produced and traded, as well as transforming the role of information in contemporary society. Shortened lead times between successive innovations have made people more aware of technology's impact on their lives and have caused decision-makers to conjecture about what will be the future effects of advances in other fields such

80 In the preparation of Part Two of this Report, the secretariat benefited from contributions by a few persons from outside the United Nations system, either in the form of short background papers commissioned for this purpose or extensive comments provided on different sections. Among those who prepared background papers were J. Aylen, University of Salford, United Kingdom; G. Dosi, University of Milan, Italy; G. Hamilton, independent consultant, United Kingdom; D. Jones, Science Policy Research Unit, University of Sussex, Brighton, United Kingdom; J. Monkiewicz and J. Maciejewicz, Central School of Planning and Statistics, Warsaw, Poland; and L. Mytelka, Carleton University, Ottawa, Canada. In addition, helpful comments and suggestions were provided by P.E. Fong, Singapore University, Singapore; M. Elmandjra, University Mohammed V. Rabat, Morocco; F. Sagasti, Group of Analysis for Development, Lima, Peru; J. Schott, Institute for International Economics, Washington, D.C., United States; and V. Swaminathan, Department of Science and Industrial Research, Ministry of Science and Technology, New Delhi, India.

as new materials and biotechnology. Further serving to increase these tensions is a third major development which is a central preoccupation of this part of the Report: the apparent shift of the relative position of the United States as compared particularly with Japan, EEC and a small number of rapidly growing developing countries in the world market place. Opinions differ as to whether this represents a transitory or secular phenomenon and as to the relative importance of the possible underlying causes - fiscal deficits, exchange-rate differentials, protectionist measures and unfair trade practices, and technological factors. As one of its main objectives, this part of the Report attempts to consider the effect of changing technological advantage in explaining the changing pattern of international trade competition. An improved understanding of the evolution that is taking place, and of the respective roles of technology transfer and technology generation, has now become essential to the formulation of national and international economic policies.

The three principal conclusions of this part of the Report are that (i) contrary to a static conception of the determinants of international trade and specialization, comparative advantage *can be created* by the knowledge accumulated and generated by the individual enterprises of a country; (ii) the changing pattern of international trade is a reflection of the emergence of technological multipolarity involving a growing convergence among industrialized countries and a growing divergence between more advanced and less advanced developing countries; and (iii) at a time when the sources and forms of technology available to developing countries for improving their capacity to compete in the world market are increasing, the overall international flow of technology to developing countries has declined.

The term *competitiveness*, as used in this Report, refers to an end result: to the capacity of a country's exports to gain shares in international markets. At one level, the global performance of its exports is a reflection of the collective performance of its enterprises, of their dynamism and ability to compete. At the same time, however, the behaviour and performance of a country's enterprises is itself influenced by a complex set of structural parameters that make up the national environment in which they operate.[81] As a background to chapters I through V, the following section attempts to relate the kinds of factors affecting international competitiveness to some of the recent thinking on innovation and technical change.[82]

B. Some characteristics of technological innovation and change

Attempts by economists to bring technology into their theories of economic growth and international trade date back only a few decades and it is only very recently that thinking has begun to change on the nature of the process of technological innovation and change and the importance of technology in helping to explain the competitiveness of countries' exports. This brief review of recent thought on the subject is divided into three parts dealing, respectively, with the nature of innovation and change in the firm, the relevance of core technologies to competitiveness and the national environment for technological innovation.

1. The firm-specific cumulative nature of technology

The key productive actors in the process of technical change are enterprises. Much of what constitutes technology, or ways of doing things, is acquired and developed at the level of the enterprise as a result of the expenditure of human effort by its management and employees and is specific to the enterprise. Tech-

81 See F. Chesnais, "Science, technology and competitiveness", in OECD, *Science technology industry*, STI review, No.1, Paris, Autumn 1986.

82 For a more extensive review, see F. Chesnais, *op. cit.*, and G. Dosi, K. Pavitt and L. Soete, *The economics of technical change and international trade*, Wheatsheaf, Brighton, 1987 (forthcoming).

nical knowledge is also embodied in blueprints, designs, machinery and intermediate goods that can be purchased outside of the enterprise or from outside the country. But the ability to master it is something which is developed cumulatively over time via the acquisition of skills obtained through production experience, investment in R and D, learning and imitation.[83] The knowledge is, in part, tacit - which means that one may know or learn how to do something and at the same time be unable to explain satisfactorily how it is done. All of this is a way of saying that an important part of technology is firm-specific; it cannot be simply transplanted but must be learned by experience, or more precisely, by the interaction between experience, technology transfer and R and D. But in its search to master new techniques and turn out new products, including those involving radical jumps from the past, the enterprise will be constrained by its existing technological base and experience. Thus, for example, it has been argued that the accumulated skills of United States firms in the woodworking and metalworking sector in the nineteenth century enabled them to move downstream into the manufacture of textile machinery, machine tools, firearms, sewing machines, bicycles, motorcycles and eventually automobiles.

Another important aspect of technological innovation relates to the private "appropriability" of technological advances - that is, the extent to which the technology can be protected from imitation by others. It is the appropriability of a new technological innovation that makes it one of the innovating firm's key assets, the exploitation of which gives it an edge over competing firms in the same industry. In practice, however, most innovations are difficult to keep secret. In such circumstances it is not uncommon to observe that firms that may be good at being first on the market with an innovation often fail to obtain satisfactory returns on their new product or process; whereas imitators or competitors from the same or another country earn most of the profits. It has been argued that the reason this may occur is that the imitators or competitors possess or have favourable access to certain complementary assets, such as well-developed manufacturing, marketing, or after-sales service capabilities.[84]

A third feature is the wide pattern of relationships and linkages that exist among sectors of an economy in the sources and nature of innovations. Evidence shows, for example, the overwhelming importance of manufacturing as the producer of most of the innovations that get used in other parts of the economy such as services, construction and agriculture. Even within the manufacturing sector, certain industries draw more heavily from process or product innovations in other industries than vice versa. In this context, three main categories of firms have been identified:[85]

- Supplier dominated firms - located mainly in traditional sectors of manufacturing, such as textiles (as well as in agriculture and services), in which innovations originate mainly from suppliers of equipment and materials;
- Production-intensive firms - located in industries producing standard bulk materials (such as steel and glass), consumer durables and automobiles and whose process innovations, many of which they produce themselves, arise out of pressures to exploit economies of scale;
- Science-based firms - principally in electronics and electrical industries (requiring the prior development of concepts of electromagnetism, radio waves and solid state physics) and chemicals (requiring the prior development of synthetic chemistry and biochemistry) which innovate over a wide range of product groups, mainly within their own principal sector.

In understanding the origins and characteristics of intra- and inter-industry innovations, it is useful to apply the notion of "technological trajectories" that has emerged from the research of a number of analysts that have explored the cumulative and dynamic nature of technical change. The concept of technological trajectory refers to the self-generating path that technological advance in one or more domains may take, as it overcomes economic problems and progressively exploits the opportunities perceived by engineers to be inherent in the technology.

The two most familiar examples of such trajectories over the past century and a half of industrialization are the progressive exploitation of latent economies of scale in a number of industries, such as chemical processing and power generation; and, in almost all industries, the continuous mechanization of processes

83 See R. Nelson and S. Winter, *An evolutionary theory of economic change*, Harvard University Press, Cambridge (Mass.), 1982.

84 D. Teece, "Profiting from technological innovation: implications for integration, collaboration, licensing and public policy," *Research policy*, Amsterdam, December 1986.

85 K. Pavitt, "Sectoral patterns of technical change: towards a taxonomy and a theory," *Research policy*, Amsterdam, vol. 13, 1984.

previously done by hand, with a view to reducing costs and increasing the reliability and precision of production.

Another example of a technological trajectory that has been identified more recently is a secular trend towards product and process innovations that are resulting in a progressive reduction in the material content of production. This trajectory encompasses technological changes that on the one hand are generating a demand for goods whose raw material content is lower than for previously consumed goods. At the same time, it is marked by a reduction of the raw material content of existing products through the replacement of one material by a new or improved substitute for it in given end uses and through a wide range of innovations by users and producers of materials that result in a diminished need for, or more economic use of, raw materials.[86] Although material substitution is as old as industrialization itself, the general tendency towards decline in intensity of material use dates from the early 1970s and is attributed to the upward shift in energy prices and intensified concern over the environment at that time as well as the search for ways of reducing dependency on external suppliers (induced by increased volatility in the world economy) and for ways of reducing costs (induced by the economic slow down). Two characteristics of this trajectory are worth underlining. One is that it describes generally the behaviour of a large number of industries and affects the consumption of most agricultural raw materials and minerals, ores and metals that are exported by developing countries to industrialized countries. The other is that the actual pattern and timing of changes in the intensity of use of different commodities arising from materials substitution and materials saving depends not on technological change alone, but also on shifts in relative prices and costs, income levels, the impact of government policies and the interaction of technology with all of these factors.

2. *Impact of major innovations or core technologies*

Occasionally in history, the accumulation of techniques or of scientific advances has culminated in a synthesis leading to a major technical or scientific discovery that is accompanied by a resulting clustering of a large number of interrelated technological innovations.[87] One of the most obvious and closely studied examples is the development of the steam engine in the eighteenth century, which served as the core technology for subsequent developments in locomotives and steamships, a large number of textile machinery innovations, advances in steel technology, bridge construction, machine tools, and a number of other important developments during the same century. Other examples of major innovations or discoveries that have served as the core of an inter-connected technological system of derivative changes in products and processes have been organic chemistry and synthetics, electricity and mass production assembly lines.

The key element in the technological systems generated by each of the core technologies has been an input or set of inputs capable of steering the pattern of associated technological changes, because of the input's low and rapidly descending relative cost, its unlimited supply and its perceived ability to drastically reduce costs and change the quality of machinery, labour and products. The succession of one technological system by another is marked by radical transformations of existing inter-industry relationships, economic structures and institutions.

Today, it is the production and progressive diffusion of increasingly less expensive, more powerful and more compact electronic memory circuits and electronics information processing devices that is at the core of a newly emerging industrial system which many observers believe is gradually replacing the preceding system based on a constellation of mass production technologies fuelled by low cost oil. Very briefly, there are three main characteristics of the microelectronics paradigm that set it apart from the type of technological system that emerged in the years following the Second World War. One is its vast information handling potential which is pushing production to-

86 For a more detailed summary of the evidence on these questions, see "Impact of new and emerging technologies on trade and development" (TD/B/C.6/136), UNCTAD, Geneva, 14 August 1986.

87 For a more detailed exposition of the ideas summarized in this sub-section, see C. Freeman and C. Perez, "The diffusion of technical innovations and changes of techno-economic paradigm," Paper presented to the Conference on Innovation Diffusion, Venice, 17-22 March 1986; and C. Perez, "Microelectronics, long waves and structural change: new perspectives for developing countries," *World development*, Oxford, March 1985.

wards greater *knowledge intensity* through computerized automation of manufacturing and design functions and through the development of products with high knowledge content. The second is *flexibility*, the possibility, as a result of computerized controls, of programming rapid successive changes in product designs, product mixes and production schedules with a comparatively low loss of efficiency. The third is *integrative organization* - the fusion through digitalized computer communications of all of the design, productive, marketing and co-ordinative functions of the firm into a single, sometimes worldwide, network permitting inter-active responses and multidirectional flows of information between all parts of the organization and with suppliers and consumers.

Within any paradigm - electro-mechanical, oil-based mass production or microelectronics - the two main evolutionary processes of technological change are innovation and diffusion. The former increases the gap, including the international gap, between firms in an industry, whereas the latter decreases it. Generally speaking, the rate of diffusion of a technological innovation will be faster, the greater is the pre-existing level of technological capability of the users. Even if the manufacture of a new product or a new cost-reducing process were ideally profitable for every firm in an industry, disparities in technological and organizational capabilities, uncertainties concerning the outcome of the required investment, unequal access to financial resources and differences of approach in screening new technologies would produce different rates of adoption. The prevalence of these asymmetries[88] in an industry accounts for the existence at one and the same time of different firms - and, by extension - different countries producing better or worse products with better or worse techniques. Thus, inter-firm and inter-country asymmetries in capabilities explain the differences in the pattern of diffusion between firms and between countries. By the same token, asymmetrical rates of diffusion of technology help to explain differences in economic performance between the leaders (firms, countries, respectively) and followers.

3. *The origin of technological dynamism*

The interpretation of technology and innovation presented above has brought out the importance of technological capabilities and their accumulation in explaining the degree of innovativeness of the enterprises of a country in a particular industry. Somewhat more difficult to interpret and assess are the many factors that influence this accumulation of technological capabilities and lead to inter-firm and international differences in such capabilities. The following discussion explains the origin of technological dynamism as the result of the interplay of three major types of stimuli:[89] interplay of supply and demand forces expressed through the market; links between the productive sector and the science system; and the industrial structure which determines the nature of competition and efficiency of inter-firm co-operation.

Market stimuli provide an inducement to innovate through their effects on profitability. These stem from the abundance of particular inputs, (e.g. land in the United States) or alternatively, critical scarcities of them (skilled labour in developing countries, raw materials in Japan), specific patterns of demand (product cycles, the size, rate of growth and sophistication of the market) and the level of prices and changes in relative prices.

The *research system*, broadly defined as universities plus specialized research institutes, provides a strong influence on innovation performance when its links with the productive sector are strong. Countries differ as to the extent to which their universities and technical schools respond to the demand of industry for scientific and technical personnel of particular types, the extent to which their firms provide support for academic research or make use of consultants from engineering and science faculties, and the extent to which their governments promote collaborative arrangements between industry, universities and specialized research laboratories.

The *structure of industry* and the related conditions and perspectives of profitability link the pull to innovation coming from market stimuli to the push arising from opportunities created by advances in science and technology.

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88 The concept of technological asymmetries was used in "Technological dependence, its nature, consequences and policy implications" (TD/190) in *Proceedings of the United Nations Conference on Trade and Development, Fourth session, Vol. III - Basic documentation, United Nations publication, Sales No. E. 76.II.D.12.*

89 See H. Ergas, *Why do some countries innovate more than others?*, Centre for European Policy Studies, CEPS papers No. 5, Brussels, 1984.

The nature and intensity of competition in an industry must be such as to permit the existence of firms large enough to finance investment in risky R and D and to bear the cost of designing and manufacturing new products capable of winning acceptance in the market. It must be conducive to technological rivalry among existing firms and between these firms and potential entrants to the industry. Given the investment stake of existing firms in the prevailing technology, the prospect of new entrants with no commitment to old product lines and engineering products is essential for the initiation of change. Ease of entry varies with a number of factors: with the supply of entrepreneurship, technical knowledge, skilled labour, financing and risk capital; with the degree of access to suppliers of specialized equipment and intermediate inputs and to distribution channels and markets, including public procurement; and with the costs of potential failure. A second aspect of industrial structure influencing the climate for technological advance relates to the existence (despite inter-firm rivalry in other domains) of mechanisms permitting firms to co-operate in carrying out risky, high-cost, long-term research of benefit to the industry as a whole and in reaching a consensus on standardization (thereby lowering the costs of entry) in order to permit the achievement of economies of scale.

The relative significance of the various inducement mechanisms discussed above and the potential opportunity for innovation differ by industry and their intensity varies by country, in part because of the influence of government policy.[90] Although these inducements are necessary, they are not sufficient conditions for the competitiveness and innovative performance of a country's firms to manifest themselves. Sufficiency, it has been argued, is provided by the existence of a correspondence between the nature of the stimuli produced - by market forces, linkages with the R and D system and by the industry structure - and the accumulated scientific and technological capabilities available in each country that are the basis of its advantage. These capabilities are "...not in any direct sense an endowment, but the outcome of processes of discovery, learning, imitation and improving, jointly with the process of capital accumulation..."[91]■

90 A further, more complex and less well-understood influence comes from the social and cultural environment, a subject beyond the scope of this Report.

91 Dosi, Pavitt and Soete, *op.cit.*

Chapter I

INTERNATIONAL SCIENCE AND TECHNOLOGY INDICATORS

The fact that technological innovations originate from a variety of sources and that innovative activity takes several different forms makes it difficult to find direct measures of this type of activity. In many innovation studies, therefore, the common practice has been to assess various indicators of one or more of the components of the innovative process. The convention has been to distinguish between *input indicators* of the resources and effort spent in producing innovations and *output indicators* of the ability to introduce new products and processes.

Input indicators are easier to find than output indicators. Moreover, the use of these indicators in measuring innovation requires some qualification. There is no one-to-one correspondence between resources and effort spent and the desired result, technological innovation in the form of a new or improved product, process or service. Much, for example, depends on the quality of the resources and how they are spent; effort need not produce a positive outcome; an idea may lead to an output without going through all of the intermediate steps required in the innovative process; or the outcome may not be utilized.

The main statistical indicator of national innovative effort used in this Report is R and D spending (although others, such as literacy, number of scientists and engineers and volume of scientific articles are also relevant). Patent performance and productivity are used as the output indicators of innovation. Patents have been criticized as relating to invention rather than innovation. They are also criticized on the ground that many innovations are not patented. Despite these limitations, experts on the subject have found all three types of measures to be useful in making tentative assessments of the nature of innovative effort and how it contributes to the ability of firms from different countries to compete in the world market. Because of their limitations, the present Report makes an attempt to complement the aggregate analysis based on innovation indicators and market share in international trade, with case studies on technology and competitiveness in five individual industries (see Annex 1).

A. Research and development

It has been estimated that the world spent over $265 billion on research and development (R and D) in 1983, thus more than doubling the level of outlays in 1970. Of the total, $192 billion were spent by developed market-economy countries, $64 billion by the socialist countries of Eastern Europe and the rest by the developing world.[92] The large concentration of R and D spending in a handful of countries is illustrated by table 25, which gives the percentage distribution of global R and D expenditures for 1970-1983. In 1983 the United States, together with Japan, accounted for 80 per cent of the developed market-economy total, whereas the Soviet Union by itself was responsible for nearly 75 per cent of total R and D outlays in the socialist countries of Eastern Europe. Developing countries as a

92 UNCTAD secretariat estimates based on OECD, *Selected science and technology indicators: recent results 1979-1986*, Paris, September 1986; and data supplied by the CMEA secretariat. For more details on developed market-economy countries, see Annex table 1.

Table 25

DISTRIBUTION OF R AND D EXPENDITURES BY COUNTRY GROUPS

(Percentage of world total)

Region/country	*1970*	*1975*	*1980*	*1983*
World	100.0	100.0	100.0	100.0 [a]
DMECs *of which:*	72.5	70.2	72.7	72.7
EEC	20.3	21.6	21.5	20.9
Japan	6.7	9.5	11.7	12.6
United States	39.9	33.3	33.7	33.4
Socialist countries of Eastern Europe *of which:*	25.2	27.1	24.4	24.2
USSR	19.4	20.9	17.6	18.0
Developing countries	2.3	2.7	2.9	3.1

Source: OECD, *Selected science and technology indicators: recent results 1979-1986*, Paris, Sept. 1986.
a World expenditure on R and D is estimated to have exceeded $265 billion in 1983.

group still contribute negligibly to the measured level of innovative effort. However, as shown in table 26, R and D performance as well as that of related science and technology input indicators has improved significantly over time.

Rates of growth in R and D spending have contrasted sharply in different countries and areas. The average growth rate for Japan has been over twice that of the developed market-economy countries as a group for the above period. The rate for the United States leveled off during the first half of the 1970s (Annex table 1) and increased to over 4 per cent thereafter, whereas EEC experienced stable growth at slightly less than 4 per cent for the whole period (with rates markedly above the average for the Federal Republic of Germany and Italy and rates below the average for the United Kingdom and the Netherlands). Although the United States continues to be the largest R and D spender among the developed market-economy countries, the faster growth of Japanese R and D spending has meant a reduction in the pre-eminence of the United States. Its share of the world total declined from 40 per cent in 1970 to 33 per cent in 1983, as can be seen from table 25. As far as the number of scientists and engineers engaged in R and D is concerned, its distribution worldwide departs significantly from that of R and D expenditures. It is estimated that around 60 per cent of the world total R and D personnel is employed in the socialist countries of Eastern Europe, around a third of the world total in developed market-economy countries and the rest (around 7 per cent) in the developing world.[93] On the whole, world total employment of scientists and engineers comes close to 3 million.

Absolute figures on R and D spending or R and D intensity (measured by the ratio of R and D expenditures to GNP) are not an accurate measure of the scientific and technological effort, if defence-related expenditures on R and D are not excluded. When defence-related expenditures are included (Annex table 2), the United States had the highest R and D intensity of any developed market-economy country in 1961. It was surpassed by the Federal Re-

93 UNCTAD secretariat estimates based on OECD, *Science and technology indicators, op.cit.*, and on data supplied by the CMEA secretariat.

Table 26

SELECTED SCIENCE AND TECHNOLOGY INDICATORS [a]

Indicator	Year	Developed market-economy countries	Developing countries by region				Selected developing countries			
			Total	Africa	Asia	Latin America	Argentina	India	Rep.of Korea	Singapore
1. Estimated number of scientists and engineers engaged in R and D (per million population)	1970	2,317	84	56	81	135	271 [b]	187 [c]	160 [d]	175 [b]
	1980	2,986	127	91	115	251	359 [f]	131 [f]	803 [g]	296 [e]
2. Estimated expenditure for research and experimental development (percentage of GNP)	1970	2.4	0.3	0.3	0.3	0.3	0.3 [c]	0.4 [c]	0.3 [c]	..
	1980	2.2	0.5	0.3	0.5	0.5	..	0.7 [f]	1.1 [g]	0.3 [e]
3. Professionals and technicians as a percentage of economically active population	1970	11.1	5.5	4.4	4.3	7.7	..	2.7	4.1	7.7
	1980	14.3	7.5	5.4	5.6	8.2	..	2.9	4.6	9.4
4. Literacy rate (per cent)	1970	98.0	57.6	18.2	40.1	83.6	92.6	33.4	87.6	68.9
	1983	98.0	74.0	45.4	71.4	90.3	95.5	43.5	87.6	86.1
5. Ratio of primary and secondary enrolment to school age population (per cent)	1970	91.5	61.0	42.0	56.0	76.0	80.0	41.0	76.0	77.0
	1983	94.0	72.5	53.5	70.0	87.0	89.0	58.0	96.0	80.0

Source: Indicators 1, 2, 4 and 5: UNCTAD secretariat calculations, based on UNESCO, *Statistical Yearbook 1986*, tables 5.1, 5.2 and 5.4; Indicator 3: ILO data bank.

a The indicators shown are estimated on the basis of samples of countries. The size of the samples is governed by the availability of data.

b 1971.

c 1970.

d 1972.

e 1981.

f 1982.

g 1983.

public of Germany and the United Kingdom in 1978 and regained its predominance in 1983. However, when defence-related R and D ex- are excluded (Annex table 3), both the Federal Republic of Germany and Japan have consistently higher R and D intensity ratios than the United States throughout the entire period.

On the whole, however, the highest R and D intensity over the last decade was registered in the socialist countries of Eastern Europe, which traditionally have rated this activity among their top national priorities. Over the last decade, they allocated sums ranging from 2 per cent to 5 per cent of their national income to R and D purposes, with the Soviet Union, German Democratic Republic and Czechoslovakia at the top of the list.[94] Valid figures for defence-related expenditures on R and D in these countries are difficult to find. However, according to one analyst, the Soviet Union, together with the United States, accounted for 80 per cent of all such expenditures world-wide.[95] This would suggest that the defence-related element represents a high percentage of total R and D spending not only in the United States, but also in the Soviet Union.

Some of the bias in making international comparisons can be eliminated if industrial R and D intensity is measured as a ratio to domestic product (value added) in industry, since it excludes services, which take up little R and D spending but are a large part of GNP in most countries. In 1983, the industrial R and D ratio was highest in the Federal Republic of Germany, followed by the United States, the United Kingdom, Japan and France (Annex table 4). The picture changes when government-financed resources in support of industrial sector R and D are excluded. A striking 98 per cent of funding for industrial R and D activity in Japan was generated by the private sector in 1983 compared with 82 per cent in the Federal Republic of Germany, 73 per cent in France, 68 per cent in the United States and 63 per cent in the United Kingdom.[96] Thus, whereas United States industry is more R and D intensive than the Japanese when government funds are included, it is less R and D intensive when government funds are excluded.

For developed market-economy countries as a whole, the leading industries in terms of receipt of financial resources for R and D have been electrical/electronic, machinery (including computers) and aerospace. Nearly half of all government R and D resources have been devoted to defence and space, because of the absolute importance of the United States in the totals. More typically, however, developed market-economy country governments have individually devoted over 40 per cent to the development of knowledge (i.e. non-military university research), 10 per cent to health and welfare and less than 10 per cent to defence and space.[97]

A widely debated question concerns the benefits to industrial innovation stemming from contemporary government funding of R and D. In the case of the United States, according to a recent study prepared for the United States Congress,[98]

> The combination of the relatively large United States Government contribution to the total research and development endeavour ... and the fact that a major segment of the United States Government's funds for R and D are for defence-related work, ... creates the possibility that decisions affecting the scope of direction of R and D in the United States might be deflected from commercially-oriented pursuits toward additional government-related activities. The argument has been made that many commercial successes have been "spun off" from government-oriented work. However, the increasing specialization and technological sophistication of much of the current efforts may make spin-offs less likely ... The President's Commission on Industrial Competitiveness found that '... Government-funded mission-oriented R and D is not a major contributor to industry's ability to innovate and produce'. While after World War II, Federal support of certain programs resulted in commercial products, and processes, industry now is the primary innovation sources and '... Government has increasingly become a net user, not a provider, of industrial technology.'

The spin-offs from defence-related R and D efforts in the Soviet Union would seem to be even less commercially significant.

94 Data supplied by CMEA secretariat.

95 M. Acland-Hood, "Statistics on military research and development expenditure", Stockholm International Peace Research Institute, *World armaments and disarmament, SIPRI Yearbook 1985*, Taylor and Francis, London, 1984.

96 United States Congress, Joint Economic Committee, *Technology and trade: indicators of United States industrial innovation*, United States Government Printing Office, Washington, D.C., 1986.

97 OECD, *Science and technology indicators, op.cit.*

98 United States Congress, *op.cit.*

B. Patents

Although patents are intuitively interpreted as a measure of invention - i.e. of the creation of a new idea or knowledge - they are also viewed as a useful indicator of the output of the science and technology system, that is of innovation. As measured by *domestic patents* - that is, the number of patents granted within a country to the residents of that country - innovative output has been nearly stagnant over the last 10-15 years. Between 1975 and 1984, the number of patents granted worldwide to nationals at home increased by only 12.7 per cent, reaching a level of over 216,000 in 1984.[99]

The patenting performance of developed market-economy countries as a group declined throughout 1975-1982, but increased considerably in 1983-1984. Within this group, however, the performance of the individual countries varied significantly. The biggest losers were the United Kingdom (whose share of the world total decreased from 4.8 per cent in 1975 to 2.1 per cent in 1984) and the United States (24.3 per cent and 17.7 per cent, respectively). On the other hand Japan, and to a lesser extent the Federal Republic of Germany, have improved their performance.

In contrast to developed market-economy countries, the socialist countries of Eastern Europe reported significant improvement in patenting performance throughout the 1970s, but there has been a decline since the early 1980s. On the whole, the share of the socialist countries in the world total of domestic patents granted went from 29.6 per cent in 1975 to 40 per cent in 1984. This was due mainly to the improved performance of the Soviet Union and German Democratic Republic. The only socialist country of Eastern Europe that decreased its patenting performance throughout the whole period was Poland.

Patenting by residents of developing countries is extremely small compared with both developed market-economy countries and socialist countries of Eastern Europe, especially when calculated on a per capita basis (see Annex table 5). Moreover, there generally appears to be no visible evidence of improvement of this performance over time.

Because of disparities in the patentability criteria in different countries, *external patent applications* (which have, on the average, a lower approval rate by national patent administrations than domestic registrations) are considered to provide a more accurate comparative measure of innovative activity in different countries than domestic patent registrations. Parallel to the decrease in national patenting, developed market-economy countries as a whole have experienced throughout the 1970s a sharp decline in their external patenting. In the case of the United States, the number of foreign patents received decreased from over 78,000 in 1970 to 52,500 in 1981. In the case of the United Kingdom, the number of foreign patents received fell from over 17,000 in 1970 to below 10,000 in 1981, in Switzerland from 12,600 to 8,400, in France from 15,600 to 11,500. The only developed market-economy country which significantly increased its foreign patenting was Japan, which received 10,767 patents in 1970 and 19,649 in 1981. The situation seems to be changing in the early 1980s and the upward trend in foreign patenting of the said countries is visible (see table 27). Foreign patenting performance of the socialist countries of Eastern Europe is comparatively low in relation to developed market-economy countries and their world-wide share oscillates around 3-4 per cent.[100] They improved their foreign patenting performance in 1970-1975, only to suffer significant losses in 1976-1981. Their position has since improved.

One possible interpretation of the stagnation in the number of patent registrations in many of the developed market-economy countries is not that innovative activity has necessarily declined, but rather that the behaviour of patents does not accurately reflect changes in such activity. For the individual enterprise, the patent is considered but one - not necessarily the most effective - means of appropriating the technology that it has generated, e.g. protecting it from imitation by others. Research on the strategies of innovating enterprises has shown that secrecy and other

99 World Intellectual Property Organization, *100 years of industrial property statistics - synoptic tables on patents, trademarks, designs, utility models and plant varieties 1883-1982*, Geneva, 1983; and *Industrial property statistics 1984*, Geneva, 1985.

100 Based on data supplied by the CMEA secretariat.

Table 27

EXTERNAL PATENT APPLICATIONS IN DMECs

(Percentage distribution by country)

Country	*1965*	*1970*	*1975*	*1980*	*1983*
United States	36.9	34.6	31.0	29.8	31.7
Federal Republic of Germany	18.9	19.6	20.2	21.1	17.9
Japan	3.0	7.4	9.2	11.6	12.9
France	7.0	6.8	7.8	8.4	8.0
United Kingdom	11.6	9.4	8.1	7.2	7.9
Switzerland	6.9	7.3	6.6	5.8	5.1
Italy	2.6	2.9	3.4	3.2	3.2
Sweden	2.7	2.4	3.1	2.9	3.2
Netherlands	4.0	3.4	3.3	3.1	3.0
Canada	1.7	1.4	1.7	1.2	1.3
Australia	0.5	0.5	0.7	0.9	1.2
Austria	1.0	1.1	1.1	1.2	1.1
Belgium	1.4	1.1	1.1	1.0	0.9
Denmark	0.8	0.7	0.8	0.7	0.9
Finland	0.2	0.3	0.4	0.5	0.8
Norway	0.3	0.3	0.4	0.3	0.4
Spain	0.3	0.4	0.6	0.4	0.4
New Zealand	0.1	0.1	0.2	0.2	0.2
Ireland	0.1	0.1	0.1	0.1	0.1
Greece	-	..	0.1	-	-
Portugal	-	-	0.2	-	-
Iceland	..	..	..	..	..
Total	100.0	100.0	100.0	100.0	100.0

Source: As for table 26.

methods are also employed for this purpose.[101] One possible explanation for the levelling off of patenting, therefore, may be a decline in the propensity to patent - that is, a decline in the percentage of patentable inventions that are actually patented. Preliminary survey research on this issue, however, provides no evidence in support of this hypothesis for United States firms.[102] On the contrary, the firms surveyed have reported an increase in the percentage of their inventions that they patent. The author of this research concludes that the levelling off in the annual number of patents granted domestically to United States inventors in recent years is indeed a reflection of a reduction in the number of inventions (though not necessarily of their average "quality"). More information is obviously necessary to shed light on this issue, which is the reason that this Report makes use of other measures of innovative activity and competitiveness.

101 See S. Wyatt, *et al*, "Patents and multinational corporations: results of questionnaires", *World patent information*, vol. 5, no. 3, 1985; and R. Levin *et al, Survey research in R and D appropriability and technological opportunity, part I: Appropriability*, Department of Economics, Yale University, New Haven, 1984.

102 E. Mansfield, "Patents and innovation: an empirical study", *Management science*, February 1986.

C. Productivity

Productivity is a measure of how well labour, capital and other inputs are utilized to produce outputs of goods and services. A change in productivity over time is an indicator of the impact of technological innovation and change on the growth of output; productivity change is one of the main mechanisms through which technological innovation influences the international competitiveness of a country's enterprises. Labour productivity, or output per employed person, is the indicator most frequently used.[103] Annex table 6 compares levels of labour productivity as measured by gross domestic product per employed person, calculated at purchasing-power-parity exchange rates (in order to ensure comparability between countries) for the period 1950-1984, for the United States, Japan, France, Federal Republic of Germany and the United Kingdom. The table shows clearly that, although the United States still had the highest level of productivity in 1984, according to this measure, the other leading industrialized countries had substantially narrowed the gap. The rate at which it was closing, however, had slowed down in the 1980s compared with the latter half of the 1970s.

Annex table 7 permits a comparison for the same countries of the evolution of manufactured output per man-hour for the period 1960-1984. Once again a clear divergence between the performance of the United States and the others is evident. In 1984, the level of manufacturing productivity of the United States had risen by 15.6 per cent from what it had been in 1977. This contrasted with increases of 67.4 per cent by Japan, 35.2 per cent by France, 22.3 per cent by the Federal Republic of Germany and 23 per cent by the United Kingdom.[104]■

[103] Strictly speaking, the change in total factor productivity is a more correct indicator of the impact of technological change, since it is not affected by substitution between different inputs. However, the calculations are complex and subject to measurement error; and internationally comparable estimates are difficult to find.

[104] However, an important distinction can be made in recent years between the extent to which productivity growth in different countries was a reflection of the growth in manufacturing output itself and the extent to which it is the outcome of a combination of some output growth and slow-growing or declining employment. The United States was apparently one of the few developed market-economy countries to have succeeded in avoiding a decrease in the number of workers employed in manufacturing in the 1970s and early 1980s.

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Chapter II

TRENDS IN THE INTERNATIONAL FLOW OF TECHNOLOGY

International flows of technology are an essential element of the global network of international economic relations. Even in developed countries, the process of innovation - in addition to the search and learning efforts of individual firms - often involves inputs of knowledge, components, patents, know-how, etc., from other firms and other countries. Conversely, as was discussed in the introduction, technology is a decisive, intangible and often firm-specific asset whose benefits the firm seeks to appropriate for itself to the greatest extent possible. The commercial transfer of technology abroad is one of the means at the firm's disposal for exploiting this advantage. The ability of a country's enterprises to appropriate some rent from transferring technology abroad by whatever means can be interpreted as a measure of their past success in achieving international competitiveness.

The international transfer of technology can take several forms, which may be either commercial or non-commercial. The latter channels are sometimes overlooked because of limited published information. They include, most notably, technical assistance funded by official government agencies and by non-governmental organizations, and also technical assistance furnished non-contractually or free of charge to the receiving enterprise by its overseas input suppliers and customers. The latter channel for the transfer of technology is reported to have been of particular significance in the accumulation of skills and know-how that have buttressed the growth of exports of certain South-East Asian countries. Non-commercial channels, in particular technical assistance, were one of the principal forms of technology transfer used in the 1950s and 1960s within the Council for Mutual Economic Assistance (CMEA), thus helping substantially to industrialize such countries as Bulgaria, Romania, Poland, and contributing to the Chinese industrial development. Later on they were widely applied in other countries, such as Cuba, Viet Nam and Ethiopia.

Commercially transferred technology is mainly realized through foreign direct investment, the export of "technology-embodying" machinery and equipment (either in the form of individual pieces of equipment or completely assembled turnkey plants), and the transfer of "disembodied" technology via the licensing of patents or supply of consultancy services. Because of the intangible nature of technology, attempts to measure its transfer using statistical data are fraught with difficulty. Some forms of foreign direct investment may not involve any technology transfer in the strict sense. For example, the mere purchase of existing assets by foreign firms, which constitutes an important share of foreign direct investment, cannot be considered technology transfer. Likewise, a significant proportion of royalty payments for licences are related to the use of trademarks, which do not necessarily entail the international transfer of technology. Moreover, in so far as royalty payments for technology are between parent firms and their affiliates, they may involve manipulation of transfer prices, making it difficult to interpret what is actually a payment for technology.

In order to assess recent trends in the international transfer of technology, one must rely on certain proxy variables which incorporate the technology element. That is why section A of this chapter pays particular attention to trends in international trade in capital goods, foreign direct investment flows, and receipts of royalties and other technology fees. For purposes of comparison, trends in official technical assistance are also analysed. Section B discusses the recent diversification in the sources technology available to importing countries and assesses the policy implications for developing countries.

A. Dimension, growth and direction of technology flows since the 1960s

As a background to this discussion, it is useful to consider very briefly some of the variables that determine the technology transfer decision by individual firms. Two different decisions at the level of the firm need to be explained: (1) Why does the firm engage in the transfer of technology rather than satisfy its objectives through international trade? (2) Under what condition would the firm license its technology to third parties rather than use it internally through the mechanism of foreign investment? As regards the first question, a firm will only have an interest in setting up overseas production facilities or licensing its technology abroad if it is profitable to do so. Economists have recently argued that, in order for profitability to be high enough to merit the risk and inconvenience of moving abroad, the firm must possess certain intangible assets (superior technology or managerial skills, access to markets or financial resources, etc.) that give it a competitive advantage over local firms in the overseas location. Moreover, it must be more economical for the firm to use its superior technology and other assets abroad than at home. This will depend on relative unit costs arising from differences in factor costs, including raw materials, and in tariffs, taxes, transport costs and size of market.

Thus, for example, a manufacturing firm that is already exporting to a given market may feel impelled to protect its share in that market by setting up local production if tariffs are imposed. A firm may find it expedient to use the foreign location as an export platform as a result of favourable wage cost differentials or as a result of the effects on cost differentials of investment incentives and export promotion measures. Alternatively, a firm producing raw material intensive products such as metals or petrochemicals may wish to ensure a more favourable access to these raw materials by producing them itself rather than importing them from independent suppliers. Another reason for investing abroad is the possibility to acquire technology through direct equity participation in a leading firm, a situation exemplified by the participation of European and Japanese companies in United States electronics firms.

There are several factors influencing the second type of decision, namely whether firms will use their technology internally by establishing a subsidiary or affiliate or externally by licensing production by host country enterprises. Internalized use of technological assets tends to predominate in the following circumstances: (1) when a technology is relatively new and has not spread significantly beyond the confines of firms that have developed it; (2) where there are difficulties in using some intangible assets (e.g. expertise in organization and management) in externalized form; (3) where the host market in question is of importance for the global operations of the firm; and (4) where the firm is of sufficient size to be able to manage efficiently production in several countries. Conversely, licensing and other externalized modes are likely to be used when the technology in question is already widely diffused, when the firm is relatively small, or when the domestic market of the host country is of marginal importance to the overall profitability of the technology-exporting firm.[105]

Government policies also affect the decision of firms as to how to transfer technology abroad.[106] The measures taken may operate either to promote or to regulate the transfer of technology. The maximization of technology transfer is often advanced as a rationale by host governments for restricting foreign direct investment to certain sectors or for requiring joint ventures with domestic partners. Performance requirements as regards the use or training of local skilled labour is another policy instrument used for this purpose. In some cases, governments have deliberately sought to "unpackage" the technology component by prohibiting foreign direct investment and encouraging arm's-length transactions in technology.

The three measures of technology transfer discussed above - imports of capital goods, foreign direct investment, and receipts of royalties and other technology fees - are, of course, related. When a domestic firm imports capital goods, in many cases it must also license the technology from a foreign firm. If it involves

105 See United Nations Centre on Transnational Corporations, *Transnational corporations and technology transfer: effects and policy issues* (United Nations publication, Sales No. E.87.II.A.4), pp. 13-16.

106 The evolution of laws and regulations on transfer of technology is reviewed in section B of chapter III.

the setting up of a new plant, foreign direct investment will normally be associated with the importation of a certain volume of capital goods. And, in many cases, parent companies receive royalty payments from their affiliates for the use of technology.

An examination of the main proxies for international technology transfer reveal some interesting patterns (see table 28). Perhaps the most noticeable change over the years has been the declining role of the United States as a source of technology-related flows and the growing role of Japan and, to a lesser extent, of the Federal Republic of Germany. This is true of technology embodied in capital goods, as well as of the technology exported through transnational corporations in the form of foreign direct investment or of licensing. An examination of the available information reveals three distinct sub-periods: (1) the one going from the early 1960s until the beginning of the world economic crisis of 1973; (2) the period from 1973 to the early 1980s; and (3) the current period.

The period of the 1960s was characterized by a rapid increase in the flows of capital goods that are related to technology transfer. This was the period of rapid expansion of United States firms abroad, particularly in Western Europe. As a result, the United States was responsible for an average of 60 per cent of the world's outflows of foreign direct investment.[107]

As could be expected, the bulk of foreign direct investment flows (about three quarters) was directed towards Western Europe and other developed market-economy countries, with the exception of Japan, which maintained rather restrictive policies toward inflows of foreign direct investment. As regards inflows into developing countries, they were attracted to a handful of countries with either mineral or petroleum resources or having relatively high incomes and large domestic markets for manufactures (e.g. Argentina, Brazil, Mexico).[108] In addition, United States firms dominated the world market for capital goods, accounting for about 30 per cent of world exports. During the 1960s, the socialist countries of Eastern Europe accounted for about 10 per cent of world exports of capital goods.

By the beginning of the 1970s some developing countries began to appear as increasingly important suppliers of capital goods to world markets, having acquired the skills to produce such goods embodying technology originating initially in the developed market-economy countries. This trend accelerated markedly in the 1970s and has continued until this day. For less industrialized developing countries, this has meant a new source of imported technology, a point taken up in section B of this chapter.

The period from 1973 until the early 1980s shows a quite different picture. Although technology-related flows continued to grow globally in nominal terms, their rate of growth in real terms was substantially slower than during the 1960s.[109] On the other hand, the exports of capital goods to the developing countries continued to expand strongly.

Two main factors account for this change in the pattern of technology flows to developing countries. The availability of an accumulating pool of financial liquidity in banking and other institutions generated by the rapid expansion of petroleum revenues provided a major source of funding for capital goods imports for those countries considered to be creditworthy by these institutions. As a result, the volume of exports of capital goods from developed market-economy countries to developing countries expanded at a rate that largely overshadowed the levelling off of foreign direct investment flows.[110] Capital goods exports from developed market-economy countries were also boosted by the ample foreign-exchange resources available to the oil-exporting countries and, to a lesser extent, to the major exporters of manufactures. However, the oil-importing developing countries without access to international capital markets and with slower-growing export receipts, particularly the least developed among them, were able to expand their imports of capital goods much more slowly, if at all. In addition, these countries continued to be unable to attract significant amounts of foreign direct investment.

It is during this period that the relative importance of the United States as a source of technology began to decline. As regards foreign direct investment outflows, although the United States was still the predominant home country, the Western European countries and Japan were becoming more important. At the same time, during this period the United States

107 UNCTAD data base.

108 This can be seen from the percentage distribution of the stock of foreign direct investment resulting from investment flows from developed market-economy countries that had accumulated by 1971, shown in table 29.

109 For developing countries, the slow-down was particularly marked for foreign direct investment inflows.

110 The forces accounting for the diversification of technology flows generally to developing countries during this period are described in section B of this chapter.

Table 28

INDICATORS OF INTERNATIONAL TECHNOLOGY FLOWS, 1962-1985

(Billions of dollars, current prices)

Indicator	*1962*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
Capital goods trade [a]															
DMECs:															
1. Exports to world	26.6	85.8	113.4	146.6	176.4	195.7	220.0	254.8	310 .0	341.5	349.8	337.6	328.6	357.4	375.6
2. Imports from world	13.7	60.4	80.8	97.9	107.7	122.4	139.5	167.5	20 4.7	236.1	231.0	227.6	236.7	276.5	298.9
3. Exports to DCs	6.5	20.9	27.8	40.5	58.0	66.2	74.6	84.5	92 .6	107.8	123.6	116.9	102.0	102.2	96.4
4. Imports from DCs	0.1	1.2	2.3	3.5	3.6	4.8	5.8	8.2	10 .4	12.8	15.0	16.5	21.1	28.1	28.5
Foreign direct investment															
5. Flows from DMECs to world	4.7	14.5	24.0	23.1	27.2	27.0	27.5	37.7	58.3	53.5	50.6	23.4	31.8 [b]	40.0 [b]	57.2 [b]
of which to:															
6. Other DMECs	2.8	9.2	13.4	20.6	14.5	13.7	18.6	24.7	32.8	41.0	42.2	30.1	33.6	39.9	33.7
7. Flows from DMECs toDCs [c]	1.4	4.4	6.7	6.6	10.5	7.8	9.5	11.1	13.5	10.1	15.3	10.4	7.8	11.3	7.7
Receipts of royalties and fees															
8. Flows to DMECs	..	3.9	4.5	5.4	5.9	6.4	7.2	8.2	8.8	9.9	11.1	11.2	12.1	..	..
9. Flows from DCs [d]	..	0.7	0.7	0.9	1.0	1.0	1.1	1.5	1.7	2.0	2.1	2.0	2.3	2.2	2.3
Technical assistance															
10.Flows to DCs	0.7	1.8	2.3	2.5	2.2	2.9	3.1	3.8	4.7	5.5	5.2	5.4	5.8	5.9	6.0
Memo item:															
Export unit values of manufactures (1980 = 100) [e]	29.5	39.3	46.3	55.8	63.3	63.0	69.9	79.3	90.0	100.0	94.8	91.5	88.5	85.0	85.7

Source: Indicators 1-4: UNCTAD secretariat calculations based on the United Nations Statistical Office trade data (Comtrade); Indicators 5 and 6: IMF, *Balance of Payments Statistics Yearbook*, various issues, except for 1962, which is from UNCTC, *Salient features and trends in foreign direct investment*, (United Nations Publication, Sales No. E 83.II.A.8), tables 1 and 2. Indicators 7 & 10: OECD, *Development Co-operation*, various issues. Indicator 8: OECD, *Science and Technology Indicators* No. 2, 1986, p.3. Indicator 9: U.S. Department of Commerce, *Survey of Current Business*; *Monthly Report of the Deutsche Bundesbank*; *Science and Technology Indicators*., Science and Technology Agency, Japan; Indicator 11: UNCTAD, *Handbook of international trade and development statistics, Supplement, 1986* (United Nations publication E/F, 86.II.D.4).

a SITC 7 - (7173 + 7194 + 7247 + 7242 + 7250 + 7291 + 7296 7321 + 7326 + 7329 + 7331).

b Including transactions between United States parent companies and their financial affiliates in the Netherlands Antilles.

c These data are not fully comparable with those shown for indicators 5 and 6.

d Flows to the Federal Republic of Germany, Japan and United States only.

e United Nations unit value index of manufactures exported by DMECs.

Table 29

DEVELOPING COUNTRIES: FOREIGN DIRECT INVESTMENT, CAPITAL GOODS IMPORTS AND TECHNICAL ASSISTANCE FROM DMECs

(Billions of dollars)

Item	Developing countries: By region					By analytical group				By income group		
	Total [a]	America	Africa	Asia	Oceania	Major petroleum exporters	Major exporters of manuf.	Least developed countries	Other developing countries	$ per capita Less than $500	$500-$1500	Above $1500
A. Stock of FDI												
1971	42.5	25.1	8.4	10.2	0.5	15.8	8.5	0.8	19.0	5.7	10.0	26.8
1978	84.9	50.6	11.1	22.5	1.3	23.1	22.2	1.6	38.6	13.3	15.7	55.9
B. Foreign direct investment												
1979	8.5	5.5	1.8	1.1	0.1	0.3	3.8	0.4	4.1	2.0	1.5	5.0
1980	6.8	6.2	0.2	0.3	0.1	-1.5	4.1	0.3	4.0	1.2	0.9	4.7
1981	21.4	7.7	1.7	11.8	0.1	10.5	5.3	0.2	5.4	1.5	2.9	17.0
1982	22.7	6.4	1.5	14.7	0.1	13.4	4.9	0.2	4.3	1.0	2.2	19.5
1983	13.7	3.6	1.5	8.4	0.2	6.0	3.3	0.1	4.4	1.1	2.6	10.0
1984	13.0	3.3	1.5	8.0	0.2	5.8	3.5	0.1	3.5	1.2	2.1	9.7
1979-1984 (average)	14.4	5.5	1.4	7.4	0.1	5.7	4.1	0.2	4.3	1.3	2.0	11.0
C. Capital goods imports												
1979	96.6	24.8	19.6	47.6	0.5	40.3	25.0	2.8	28.2	11.2	19.9	65.6
1980	111.4	29.5	23.1	54.5	0.6	48.8	26.5	3.1	32.6	13.9	22.9	74.6
1981	126.5	33.7	26.0	63.3	0.6	61.0	26.6	2.8	35.8	14.2	25.6	86.7
1982	119.2	28.0	22.1	66.2	0.5	56.6	24.4	2.6	35.3	16.3	22.2	80.7
1983	104.0	19.5	17.9	64.1	0.4	44.5	23.5	2.3	33.1	14.6	18.7	70.7
1984	104.1	23.2	17.2	61.3	0.4	40.7	26.7	2.2	34.2	13.6	17.7	72.8
1979-1984 (average)	110.3	26.4	21.0	59.5	0.5	48.7	25.4	2.6	33.2	14.0	21.2	75.2

(For source and notes see end of table.)

Table 29 (continued)

DEVELOPING COUNTRIES: FOREIGN DIRECT INVESTMENT, CAPITAL GOODS IMPORTS AND TECHNICAL ASSISTANCE FROM DMECs

(Billions of dollars)

Item	Developing countries: By region					By analytical group				By income group		
	Total [a]	America	Africa	Asia	Oceania	Major petroleum exporters	Major exporters of manuf.	Least developed countries	Other developing countries	Less than $500	$ per capita $500-$1500	Above $1500
D. Official technical assistance [b]												
1979	3.6	0.8	2.2	0.7	0.2	0.4	0.1	0.8	2.3	1.4	0.9	1.2
1980	4.4	1.0	2.5	0.9	0.3	0.5	0.2	1.0	2.8	1.8	1.2	1.4
1981	4.1	0.9	2.3	0.9	0.3	0.4	0.1	1.0	2.5	1.8	1.2	1.1
1982	4.0	0.8	2.3	0.9	0.3	0.4	0.1	1.0	2.4	1.9	1.1	1.0
1983	4.5	0.8	2.6	1.2	0.3	0.4	0.1	1.0	2.9	2.1	1.3	1.1
1984	4.4	0.8	2.5	1.1	0.3	0.4	0.1	1.0	2.8	2.2	1.3	1.0
1979-1984 (average)	4.2	0.9	2.4	0.9	0.3	0.1	0.1	1.0	2.6	1.9	1.2	1.1
Memo item: GDP in 1979	1829.0	681.0	263.0	822.0	7.0	686.0	519.0	58.0	567.0	311.0	356.0	1162.0
Population in 1979 (billions)	2.2	0.4	0.4	1.4	..	0.4	0.2	0.3	1.3	1.3	0.4	0.5

Source: Foreign direct investment: IMF, *Balance of Payments Yearbook*, various years; capital goods imports: UNCTAD secretariat calculations based on United Nations Statistical Office trade data (Comtrade); technical assistance: OECD, *Development Co-operation*, various issues.

a Including Malta and Yugoslavia, which are not allocated to a region.

b Unallocated figures are included in regional totals only.

became an increasingly important importer of capital goods.

The socialist countries of Eastern Europe also increased their imports of capital goods quite sharply during the 1970s (from about $3 billion to about $16 billion), and a number of them financed these purchases with loans from the transnational banks.[111] Judging by the growth in the number of imported licences, these countries also appear to have imported substantial amounts of unpackaged technology during this period. During the 1970s, several countries in the area changed their legislation to allow for the formation of a variety of joint ventures with foreign companies, often referred to as East-West industrial co-operation agreements.

Part of the slackening in the growth of foreign direct investment in developing countries during the 1970s as compared to the 1960s was more apparent than real and is statistically explained by the wave of nationalizations that took place in petroleum and mining. Generally, the geographical pattern of foreign direct investment did not undergo major changes. Among developing countries, a handful of more industrialized countries continued to receive the overwhelming bulk of flows. Although increasing amounts were destined for offshore assembly operations and export processing zones, most foreign direct investment in the manufacturing sector was oriented towards production for the domestic market.

The period since the beginning of the 1980s has witnessed a dramatic slow-down in most of the proxies for the international transfer of technology, particularly to developing countries. Although foreign investment flows during this period are difficult to interpret because of their volatility and of the unquantifiable reactions of transnational corporations to interest-rate differentials and shifting exchange rates, there appears to have been a stagnation or even a downturn in foreign direct investment outflows from developed market-economy countries. In developing countries, the strategy which had sought to vastly expand technology imports in the embodied form of machinery and equipment imports had been predicated upon the availability of financing from capital markets. Since the eruption of the debt crisis in 1982, such financing has practically disappeared. As a consequence, the imports of capital goods and payments of royalties and fees to developed market-economy country firms, which are closely associated with such imports, point to stagnation and retrogression.

Flows of foreign direct investment to developing countries have also declined drastically since the early 1980s.[112] Depressed primary commodity prices (including petroleum), adverse conditions in the domestic markets of host countries, acute uncertainties regarding the availability of foreign exchange for profit remittances, and protectionist pressures and actions in the major markets for manufactures have all contributed to a sharp cut-back in investment outlays by transnational corporations in the developing world.

Contrary to the experience of developing countries there has been a significant increase in the flow of direct investment into China since 1979 when that country modified its legislation. These inflows are estimated to have been about $4 billion in the period 1980-1985. A large number of laws and regulations have been enacted establishing conditions and granting incentives to foreign direct investment with the aim of modernizing the economy and also providing a basis for developing export markets. It is doubtful, however, whether the Chinese experience can be replicated by developing countries, since China offers unique conditions to foreign investors which the vast majority of developing countries cannot match. Up to now most of the investment in China has been undertaken by companies based in Hong Kong and Macau. Companies from the developed market-economy countries still find investing in China problematic, and Chinese officials are in the process of revising their procedures with a view to attracting these companies to China.

The concentration of foreign direct investment flows in the developed market-economy countries has increased in the 1980s, with the United States becoming the major host country and absorbing over 50 per cent of world foreign direct investment flows. Much of this investment does not represent technology transfer, since it is the result of a process of restructuring of United States industry by which major United States corporations have been shedding businesses that are unrelated to their core activities in an effort to increase productivity and to enhance their ability to compete in world markets. These businesses have been bought by Western European and Japanese companies that wish to position

[111] Based on information supplied by the CMEA secretariat.

[112] For an in-depth analysis of the behaviour of foreign direct investment flows in the 1980s, see "Recent developments related to transnational corporations and international economic relations: report of the Secretary-General" (E/C.10/1987/2).

themselves in the huge United States market. Some of these investments have been prompted by the growing protectionist slant of United States trade policy.

Some investments in the United States, particularly by Japanese transnational corporations, have involved a transfer of technology. A number of Japanese companies have built new plants in the United States and have brought with them new processes and product technologies and new ways of organizing production (e.g. the "zero defects" and the "just-in-time" or zero-inventory method).[113]

The diminishing technological lead of the United States during the 1980s can also be seen in other indicators of technology transfer. Not only has the United States become the largest net recipient of foreign direct investment, it has as of 1985 also become a large net importer of capital goods. In addition, receipts for licences and other technology-related fees by United States companies have stagnated in the 1980s. Generally, the rate of growth of exports of capital goods of the developed market-economy countries fell off sharply during the 1980s, partly owing to slow economic expansion in the OECD area and partly to the loss of markets in the developing world. By contrast, the leading developing country exporters of manufactures (particularly those of South-East Asia) continued to expand their exports of capital goods, although at a reduced pace compared to the 1970s.

During the entire period since the early 1960s, the *flow of technical assistance* to developing countries has remained small compared to imports of capital goods (tables 28 and 29). Relative to foreign direct investment flows, however, they appear to be somewhat more significant. It should be noted that, during the 1980s, technical assistance flows have remained practically stationary in nominal terms, after having experienced substantial increases in the 1970s. Most of the recipient countries have few alternative sources of technology available to them. Their ability to purchase capital goods has been severely impaired in the 1980s by falling primary commodity prices. Moreover, they have very inadequate access to international capital markets, and, with few exceptions, foreign corporations do not consider them to be attractive sites for direct investment. The distribution of direct foreign investment and capital goods imports, which has remained unequal throughout the whole period since 1960, is not significantly attenuated by the more even distribution of technical assistance flows. As with GDP, a relatively small number of better-off countries continues to account for the bulk of the developing country total of these two main types of technology flows. Therefore, the stagnation of technical assistance flows should be viewed with concern.

B. Evolving nature of the sources of technology flows to developing countries

The unprecedented shrinkage of technology flows, in the forms discussed above, to developing countries during the last few years may have serious implications for the growth prospects of these countries. It is not evident that the classical channel of technology transfer to developing countries - the creation or acquisition in the host country of wholly- or majority-owned subsidiaries by large transnational corporations - will necessarily regain its previous importance. Some experts have argued, even before the current overall decline in North-South technology trade had been perceived, that a variety of new forms of foreign investment or technology transfer have come to play an increasingly significant role.[114]

The term "new forms" has been used to refer to joint international business ventures in which foreign-held equity does not exceed 50 per cent and to various kinds of international contractual arrangements involving no equity capital. In addition to the major non-equity forms of technology transfer that have been discussed in this chapter - such as licensing and know-how agreements and imports of machin-

113 See Case 3, the automobile industry, in Annex 1.

114 See Charles Oman, *New forms of international investment in developing countries*, OECD Development Centre, Paris, 1984.

ery, plants and equipment - the list can be expanded to include management contracts, franchising, international subcontracting, leasing and countertrade arrangements involving technology transfer. In a more general sense, the sources of technology available to developing countries have been enlarged to include not only new forms of transfer but also a greater number of different types of technology suppliers from a wider range of countries.

The expansion of the sources for the transfer of technology to developing countries is a significant development for several reasons. Firstly, it permits a greater volume of technology flows. Secondly, for some developing countries, it means the importation of technology on politically more acceptable terms. Thirdly, it increases the range of options open to technology-receiving firms, thereby permitting them to shop around for better terms and conditions with a lower foreign-exchange cost. Finally and most importantly, where a sufficient level of managerial and technical capacity already exists, the possibility of separating some of the individual elements of technology, management and marketing from all-encompassing, majority foreign-owned ventures, permits local partners and firms to assume a greater involvement in the design, construction and operation of the investment project. This accelerates the absorption and mastery of imported technology and contributes to the further build-up of domestic capacity.

1. Non-equity forms of technology transfer

The evidence on the incidence and extent of different forms of transfer of technology to developing countries is still incomplete and far from perfect. However, as regards the role of traditional foreign direct investment, as distinct from other channels, a composite picture can be pieced together on the basis of partial information from balance-of-payments data, the findings of sectoral and country-level research, and other scattered information.

The overwhelmingly larger volume and decidedly faster growth of capital goods exports of developed market-economy countries to developing countries in relation to foreign investment in the 1970s and the relatively slower decline in the 1980s described in section A above is evidence that foreign investment is being increasingly superseded by other forms of technology transfer. Although a proportion of the capital goods imported by developing countries goes to affiliates of transnational corporations, it is unlikely that this represents more than 25-50 per cent of total annual investment inflows to affiliates.[115] In 1985, total foreign investment was only moderately higher than official technical assistance flows to developing countries and represented less than 8 per cent of the value of capital equipment imports (see table 28). It is clear, therefore, that indigenous (public and private) enterprises in developing countries have been the major destination of technology transfer in the form of capital goods since the 1970s and that direct investment in foreign-owned enterprises is receding in quantitative importance.

Aggregate balance-of-payments data on royalty receipts, such as they are, showed some tendency towards somewhat greater reliance on non-equity forms of technology transfer to developing countries for the period of the 1970s that was studied in detail by OECD,[116] but the movement was not dramatic. Data for the same period on affiliated versus unaffiliated foreign licensing transactions for firms of the United States and the United Kingdom, the only countries that publish such data, show some tendency for an increase in royalty receipts for independent compared with related enterprises in some developing countries for which data was available. But once again the shift was not very pronounced. There is an apparent tendency for a decline in related firm royalty receipts of the United States from the world as a whole. Because of the weight of United States firms in total developed market-economy country royalty receipts, this could also imply a relative increase in the share of patent licensing transactions between independent firms in both developed and developing countries in the last few years.

At the sectoral level, the tendency for the emergence of alternative channels for the transfer of technology to developing countries is most clear-cut in petroleum and mining.[117] Whereas the classic form of transfer of technology in both of these sectors up to the late 1950s was foreign direct investment based on traditional concession agreements, new types

115 This estimate is an extrapolation from figures for worldwide capital goods exports to United States affiliates given by G. Vickery in "Some aggregate measures of new forms of investments", Appendix, in C. Oman, *op.cit.*

116 Vickery, *op. cit.*

117 Oman, *op.cit.*

of arrangements, including joint ventures, turnkey contracts, production sharing and service and management contracts, had become common by the late 1970s. As distinct from petroleum, some wholly or majority foreign-owned subsidiaries have continued to be established in the mining sector, especially since the 1970s. Moreover, mining projects, more than those in any sector, have also involved a three-way division of risks between the host country as equity investor, the mining company as supplier of technology and marketing channels and international financial institutions as suppliers of loan capital.

Within the manufacturing industry, the picture has been more mixed than in the extractive sector, with some countries - such as Brazil and Singapore - continuing to show evidence of foreign ventures of the traditional kind and other countries, such as Algeria, showing an emphasis on direct imports of turnkey plants and machinery, and the Republic of Korea emphasizing joint ventures and licensing contracts.

2. *New actors in the transfer of technology*

With the increased heterogeneity of the forms of transfer of technology to developing countries described above has come a similar increase in the importance of the different types of agents involved in such transfer.

(a) Suppliers of machinery

The first growing source of imported technology, as is suggested by the figures on capital goods trade, has been suppliers of machinery, most of whom are unaffiliated with their host-country customers. For the most part, these are relatively small but specialized machinery and equipment manufacturers who, with the aid of lending from banks, or finance in the form of export credits or financing from other sources, have increasingly exported a part of their output directly to developing-country firms.

(b) Small and medium-sized enterprises

A second emerging source of technology transfer to developing countries is small and medium-sized enterprises (SMEs) from developed market-economy countries. Several studies by UNCTAD and other bodies suggest that SMEs have characteristics which differentiate them from larger transnational corporations with respect to their motives and strategies for internationalization through the transfer of technology and with respect to their impact on the technological development of their recipient partners in developing countries.

An assessment of the internationalization of SMEs from the United States, Japan, the Federal Republic of Germany, the United Kingdom and Canada shows that the average share of SMEs in the total number of firms of all sizes with investments abroad is about 50 per cent, the highest ratio being in Japan with over 80 per cent.[118] Many SMEs are increasingly involved in technology transactions and investments in developing countries. In France, for example, the value of technology flows from SMEs to developing countries has increased three to four fold between 1976 and 1985. The same trend has been observed in several other developed countries, particularly the Federal Republic of Germany and Italy. The Japanese SMEs accounted for about half of the total number of overseas investments made by that country's enterprises in the 1970s.

The internationalization of SMEs has also taken place in the wake of foreign investment by large transnational corporations, particularly in developing countries. This form of involvement, originating from a pre-existing subcontracting relationship, represented about 20 per cent of the overseas investments by French SMEs. Although the exact figures in other developed home countries are not easily available, most indications point to the predominance of independent internationalization of SMEs. Sectorally, SMEs with activities in developing countries are relatively most important in metal working, mechanical engineering, chemicals and electrical machinery.

As with transnational corporations, the geographical orientation of these SMEs is determined to a large extent by previous trade relationships and by historical and cultural factors. For example, Italian and French SMEs have been most active in Africa (North Africa, in particular) for light metal products and in

118 For further details concerning these countries, see UNCTAD publications as reviewed in the report TD/B/C.6/138. See also CEDREI (Centro de Estudios de Desarrollo y Relaciones Económicas Internacionales, Buenos Aires), "Technology transfer and international investments by small firms in developing countries", April 1986, Buenos Aires.

the more advanced countries of Asia and Latin America for mechanical engineering. During the 1970s, the internationalization of Japanese SMEs was centred in neighbouring Asian developing countries. However, since the early 1980s, they have gradually shifted their interest, owing in part to host-country policies which favour such arrangements but also to the fact that many of the ventures undertaken by SMEs in these host countries involve collaboration initiated by the local partner who already possessed considerable technological expertise. The possibility of sharing important functions and responsibilities with such partners increases the relative attractiveness of joint ventures or non-equity collaboration.

The mounting evidence suggests that SMEs add to the sources of technology available to developing countries and are, to some extent, complementary to TNCs. In fact, SMEs and TNCs in developing countries operate in different industries and in different contexts, particularly with respect to developed host countries.

Compared with large TNCs, SMEs have a high propensity to invest in joint ventures in developing countries.[119] This has been attributed to their weaker organizational and managerial capabilities as well as to their limited financial resource base. In Italy, for example, half of the 268 technology transfer operations in developing countries studied by UNCTAD included no equity involvement. The majority consisted of licensing agreements. The behaviour of SMEs as suppliers of technology reveals a sensitivity to the environment in which they operate. For European SMEs, for example, foreign direct investments (joint ventures) and turnkey operations predominate in Africa, where a low level of industrialization induces a request for integrated technology packages by local partners. Non-equity arrangements by these SMEs from the same countries tend to predominate in the more advanced developing countries of Asia and Latin America. This is attributable to the size of the projects in which they are involved. In general, SMEs are situated in smaller-scale industries, particularly engineering industries, characterized by the relatively standardized technologies which makes them suitable to the requirements of those sectors in developing countries.

(c) The socialist countries of Eastern Europe

A third alternative source of technology transfer to developing countries are the socialist countries of Eastern Europe, which have increased their technological capabilities over the past few decades, as demonstrated by the more than 2,000 licences that have been exported to the developed market-economy countries.[120] The flows to developing countries have concentrated in a group of countries with which the socialist countries of Eastern Europe have had important economic and political ties, such as Viet Nam, Cuba, Mongolia, India, Argentina, Iraq, Algeria, Lao People's Democratic Republic, Ethiopia and Nicaragua. Technology flows have apparently been hampered by a lack of adequate export financing facilities in the socialist countries of Eastern Europe, which partly explains why such flows have remained at a low level.

The dominant method of East-South technology flows is an integrated or system-oriented type of transfer including turnkey plant deliveries, accompanied by licensing agreements, transfer of technical documentation and technical training of local personnel. Technical assistance has had as an important component training. Moreover, a predominant part of technology transferred to developing countries from the socialist countries of Eastern Europe is of a non-equity nature. The role of equity forms is extremely limited: according to available data there are at present no more than 200 companies in the South with some participation from the socialist countries of Eastern Europe.

(d) Other developing countries

A fourth alternative source of technology transfer to developing countries - that from other developing countries - is still comparatively small in quantitative terms, but appears to be growing. It is significant both because it constitutes further evidence of a diversification of the international sources of technology and because it indicates that a considerable advance has taken place in these countries as sources of technology.[121]

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119 Japan's SMEs are an exception to this trend since nearly two thirds of them engaged in direct overseas operations in 1985 had chosen foreign direct investment as their primary mode of business.

120 Based on information supplied by the CMEA secretariat.

121 See S. Lall, editor, "Exports of technology by newly-industrializing countries", *World Development*, Special Issue, May June 1984.

Technology-related exports from developing countries have taken the form of the sale of capital goods including turnkey plants, direct foreign investment and the supply of construction and engineering and consultancy design services. Except for capital goods exports generally, over 60 per cent of which have generally gone to developed market-economy countries, flows have gone mainly to other developing countries. It is primarily locally-owned firms in Argentina, Brazil, India, the Republic of Korea, Mexico and Taiwan Province of China that have been selling turkey plants.[122] India has been the leading exporter of such plants, including especially the design, supply and erection of facilities involving complex technology, such as power stations and machine tool plants, as well as other simpler ones, such as cement, textiles, steel mills and sugar plants.

Aggregate exports of technology in the form of *capital goods by developing countries*, including both complete turnkey plants and individual pieces of machinery and equipment, have grown dramatically over the last two and a half decades,[123] including the period 1981-1985. Countries which have been exporting in excess of $1 billion per annum in recent years include all of those mentioned above (except India) plus Hong Kong, Malaysia and the Philippines. Intra-trade among developing countries, which has levelled off in recent years, has been mainly with other South and South-East Asian countries and with the petroleum producers.

Direct foreign investment by developing country transnational corporations has attracted considerable attention. The investment, until recently, has been made primarily in other developing countries and (leaving aside firms in petroleum-producing countries, whose overseas direct investment during the late 1970s and early 1980s took the form primarily of acquiring minority positions in existing enterprises with no real technology transfer) the largest single direct investor as of the early 1980s has been Hong Kong, with $1.5 - $2 billion in direct equity stock abroad, followed by Brazil, with approximately $1 billion, Singapore with $0.5 billion, and India, the Republic of Korea, Taiwan Province of China, Mexico and Argentina, with investments in the range of $50 million to $100 million each. The example of India is particularly striking, not only because of the diversity of traditional and sophisticated industrial plants that its transnational corporations are operating in various developing countries, but also because its capital outflows have recently begun to exceed inflows.

Outside the manufacturing sector, developing country transnationals are also competing with their developed country counterparts in several other fields, including especially civil engineering as well as petroleum exploration, hotel operations, banking, insurance and trade. Figures on foreign direct investment by developing countries in developed market-economy countries are available only for the United States as host country. They do show, however, that firms from the more advanced developing countries are no longer confining their establishment of overseas affiliates to other developing countries but have joined Japanese and European firms in expanding their outflow of direct investment to this destination - from $724 million to $1,268 million over the first half of the 1980s.[124]

The more advanced of the developing countries also recently became exporters to other developing countries of technology in a form that has not been discussed in the present chapter because of the limited information about it that is generally available: that is, *construction and engineering design (CED) services*. CED services are those that are provided at different stages of the implementation of investment projects, going from conception to realization, including operation and maintenance. They include preinvestment and feasibility studies; project execution services, which encompass project management and detailed and basic engineering services; procurement of construction supplies and equipment; civil works, installation of equipment; quality control, operation and maintenance services.

A partial impression of the size of the international export market for CED services and the importance of developing- country firms in this market can be obtained from unpublished data on World Bank project disbursements and from the *Engineering News Record's* annual surveys of the 200 leading international CED firms.[125] During the period 1971-1980, World Bank project disbursements

122 A review of the status of capital goods and industrial machinery manufacture in selected developing countries is contained in D. Chudnovsky, M. Nagao, S. Jacobsson, *Capital goods production in the Third World. an economic study of technology acquisition*, (London, Frances Pinter, 1982).

123 See line 4, table 28.

124 See "Recent developments related to transnational corporations ..." (E.C.10 1982.2), *op. cit.*

125 The coverage includes the top 250 firms since 1980.

amounted to $30 billion, of which $21 billion went to foreign contractors.[126] On the average over this period, payments to overseas developing-country contractors accounted for 10 per cent of the total value of disbursements. This share rose from 7 per cent in 1971 to 13 per cent in 1980. The developing countries' share, not surprisingly, was highest for construction works and supplies and lowest for consulting services, in which a higher level of expertise is required.

Also revealing are the *Engineering News Record* data on construction contract awards shown in table 30 below for the top international contractors. For the period 1978-1983, these firms won foreign awards of nearly $570 billion, of which about 16 per cent were earned by developing countries and China, a percentage that remained fairly stable over the entire period. The Repubic of Korea is unambiguously the leader, having received more contracts than all of the remaining top developing firms combined and accounting for a remarkable 10 per cent of the world market. It is followed by Yugoslavia, Brazil and India. A similar ranking is also carried out regularly by *Engineering News Record* of the rankings of the 200 leading international engineering design consultancy firms in terms of fees collected. For the period 1978-1983, these firms collected a total of $17 billion in fees, of which 4-6 per cent went to developing-country consulting firms. Lebanon is the largest developing country earner of foreign engineering consultancy fees, followed by Brazil, Republic of Korea, India and Taiwan Province of China.

By far the most striking feature of the international CED market is that it is heavily concentrated in developing countries. Eighty-five per cent of the value of international construction contract awards and a similar percentage of engineering consultancy billings of the leading firms are earned in developing countries. Virtually 100 per cent of the foreign business of developing-country firms has been in other developing countries. The main markets have been in Middle Eastern oil-exporting countries, followed by Africa, South and East Asia and Latin America.

In general, developing country CED firms appear to enjoy the greatest strength (least disadvantage) in construction-related engineering activities, mostly in the area of infrastructure, though their involvement in industrial projects is not negligible. The developed market-economy countries' strength in disembodied services - technological design, detailed and basic engineering - is unchallenged.

The same combination of deflation and external financial stringency that has produced a downturn in technology flows generally also appears to have dampened trade in technology among developing countries since the beginning of the 1980s. The leveling off of capital goods trade among these countries, already noted above, is a strong indication that foreign direct investment flows have dropped off, in parallel with the decline in such flows from developed market-economy countries to developing countries. International construction contract awards to the top 250 contractors declined to $81.6 billion in 1985 after reaching a peak of $134.4 billion in 1981. The dramatic fall in oil prices and the completion of most of the basic infrastructure in many of the oil-producing countries were especially important in this decline, which also affected international design engineering billings. Fierce international competition for a reduced market has resulted in a re-distribution of market shares among the leading firms. For international construction contract awards, this has meant that the percentage accounted for by leading developing country firms has fallen somewhat from an average of about 16 per cent in 1978-1983 to 11 per cent in 1985; whereas their share in the billings received by the top international design firms appears to have remained unchanged or increased slightly.[127]

As long as the domestic CED markets of the developed market-economy countries remain closed to international competition, the firms from these countries will continue to seek to expand their foreign business in developing-country markets, which remain relatively open. But as national firms in more and more developing countries acquire the ability to satisfy domestic demand for CED services, the growth of the international CED services market in these countries should taper off, particularly in the construction of manufacturing plants and general building structures - and in project supervision - areas in which leading CED firms have until recently enjoyed a competitive advantage in the international market.

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126 Based on a study, undertaken at the request of the UNCTAD secretariat, by A. Sapir, "Trade among developing countries in investment-related technological services", reproduced in Vivianne Ventura-Dias and Alister McIntyre (eds), *South-South trade: trends, issues and obstacles to its growth*, to be published for the United Nations by Praeger.

127 *Engineering News Record*, various issues. The interpretation of what has happened to shares in international design receipts is complicated by the increase of the coverage of the ENR survey from 150 to 200 firms after 1981.

Table 30

FOREIGN AWARDS OF TOP INTERNATIONAL CONTRACTORS BY COUNTRY: CUMULATIVE 1978-1983

(Billions of dollars)

Country	*Awards*
World	***566.6***
Developing countries and territories:	89.2
of which:	
Republic of Korea	56.2
Yugoslavia	7.4
Brazil	5.8
India	3.9
Taiwan Province of China	3.4
Philippines	3.2
Argentina	3.0
Lebanon	1.4
Pakistan	1.3
Kuwait	0.7
Singapore	0.6
Malaysia	0.5
Panama	0.4
Mexico	0.2
Thailand	0.2
United Arab Emirates	0.2
Colombia	0.1
Indonesia	0.1

Source: *Engineering News-Record*, Gainesville, Florida, various issues.

3. *A diversification of technology flows*

It is clear that the sources of technology flows to developing countries have grown in number and variety over the last few decades. In attempting to explain the many factors that may have contributed to this diversification, it is helpful to make a distinction between those that relate to developments within the technology-receiving countries themselves and those that do not. Among the former, it is the policies of the governments of technology-receiving countries that have most often been cited as being influential. As explained in greater detail in chapter III, during the late 1960s and 1970s a number of the relatively more advanced developing countries in Latin America, Asia and - to a lesser extent - Africa, enacted measures expressing a desire to exercise a greater control over their natural resources, over the activities of foreign-owned subsidiaries and over the terms and conditions of technology transfer agreements. These measures, which had a direct effect in reducing the incidence of majority-owned foreign ventures in the mining sector, may also have induced potential foreign technology suppliers in other sectors generally to exploit their know-how and other advantages in some developing countries through means other than those utilized in the past. It is likely that they also reacted to economic and technical change in these countries, including the growing capacity of local firms to absorb technology and to serve the local market. Such changes have increased the feasibility of licensing agreements with developing-country firms and of joint ventures between these firms and both larger transnational corporations and SMEs. Some SMEs manufacturing intermediate goods and components also established production facilities in developing

countries in order to capitalize on the presence of transnational corporations that were their traditional customers in their home countries. The willingness of some host governments to assume investment risks - e.g. in mining or steel and petrochemicals industries where there was already some excess capacity internationally - created a demand for imported technology in the form of licensing agreements, technical consultancy and plant and equipment orders. As mentioned previously, a growing part of this demand was (with the aid of an expanded volume of bank lending and medium to long-term export credits) filled by machinery suppliers and engineering firms which were not necessarily producers of the goods to be manufactured. The large volume of turnkey contracts in oil-producing countries during the 1970s and early 1980s offers the most striking example of the latter tendency.

In recent years, for the reasons mentioned in chapter III, the policies of many of the above-mentioned developing host countries have shifted towards a relaxation of controls over foreign investment and technology transfer agreements. Moreover, fiscal incentives and other types of facilities are also being provided, especially for the creation of foreign-owned enterprises. However, because of the depressed economic conditions in most developing countries these measures do not appear to have had a noticeable effect in restoring the relative importance of foreign investment as a mechanism for the transfer of technology.

Factors outside of technology-receiving developing countries have also influenced the evolution of new sources of technology. Among these has been the growing relative importance of Japanese and West European as compared with United States-based firms as suppliers of technology to developing countries. Since the former have had a relatively greater average propensity than United States transnational corporations to share ownership with local partners and to supply technology to non-affiliated firms in developing countries, this has been one factor in explaining the rise of low or non-equity forms of technology transfer during the 1970s and early 1980s.

A second important influence was probably the reaction of potential foreign direct investors to the uncertainty created by the economic slow-down in developed market-economy countries, the abandonment of the Bretton Woods system of fixed foreign-exchange rates and inflationary pressures during this period. A tendency to shift from long-term investment commitments to greater reliance on other mechanisms for exploiting technological advantage in developing countries, involving a shorter time perspective, was seen as a way of reducing financial exposure.

Thirdly, technology flows were also diversified as a result of the pursuit of international subcontracting arrangements in a number of Asian and Latin American countries by some developed market-economy country firms as a means of achieving the cost reductions made necessary by the intensified international competition in such industries as electronics and textiles (see case studies in Annex 1).

Fourthly, with respect to SMEs *per se*, an important explanation given for the internationalization of their activities is the growth of competition from larger firms in their home markets which, under the slack domestic demand conditions of the 1970s, induced some of them to locate, as a matter of survival, in developing countries where, because of their specialization and adaptability, they could enjoy certain competitive advantages over larger transnational corporations.

Finally, there is the addition of developing country firms to the sources of technology flows destined for other developing countries. In general, these technology flows have been the logical extension of a long process of development in the home countries of the firms concerned, which has created an industrial base for the acquisition of engineering and design capabilities. India, Brazil and Argentina have followed import substitution strategies in building up such capabilities as a by-product of the nurturing of domestic capital goods manufacturing industries. India's approach has tended to rely more heavily on local R and D and assimilation and adaptation of production know-how; whereas Brazil and Argentina have depended relatively more on imported technology and know-how in building up their own capabilities. The accumulation of technological skills in the smaller Asian economies has been associated with export-led strategies of development based initially on low-cost assembly operations. The Republic of Korea and Taiwan Province of China have progressively upgraded their capital goods, manufacturing and engineering and construction services industries with the help of imported technology, becoming successful exporters in these fields. Hong Kong, without a significant capital goods base, has relied on the development of its organizational, marketing and management skills for acquisition of important competitive advantages reflected in foreign direct investments in both manufacturing and services.

In concluding this chapter, it should be stressed that the poor economic environment

has depressed the flow of technology to developing countries from almost all sources. Nevertheless, the increased diversity in the forms and sources of these flows that has taken place in recent decades is likely to remain an enduring feature of international economic relations. The identification by the international community of ways of better taking advantage of this diversity would help to restore the flow of technology to developing countries and have a stimulating effect on the world economy generally.■

Chapter III

GOVERNMENT POLICIES ON INNOVATION AND TRANSFER OF TECHNOLOGY

Most countries have implicit or explicit policies dealing with the development, diffusion and transfer of technology. Although these policies differ from country to country, they all affect - in varying degrees - the pace and direction of technological innovation as well as technology flows between firms and countries. This chapter contains a review of recent developments and trends in government policies dealing specifically with the encouragement of technological innovation and the promotion of transfer of technology. Excluded from consideration are several types of general economic measures having an indirect impact on technology decisions, such as trade, monetary and manpower policies. Section A deals with the policy measures and instruments adopted by governments for the encouragement of technological innovations in industry. Section B examines the evolution of policies and laws on the transfer of technology in various parts of the world. Section C contains conclusions on recent trends and future perspectives in these areas.

A. Government policies for the promotion of technological innovation

The importance attached by governments of industrialized countries to an increased rate of technological innovation in their industries has led them to formulate and implement policy measures aimed at promoting and encouraging technological innovation. An elaborate structure of support measures and incentive schemes has been established in recent years by many of those countries, and new policies and programmes are being developed and adopted at a rapid rate. A few developing countries have also recently taken steps in this direction; while in the socialist countries of Eastern Europe the scope of the State actions has broadened over time, in line with the growing importance being attached to technical innovation. The specific character and objectives of these policy measures differ from country to country, depending on differences in scientific and technological capabilities, in industrial capacity and in macroeconomic conditions, as well as in political and economic philosophy. In the following paragraphs, the policy approaches of three major geographical groupings and a selected number of individual countries are briefly discussed in order to illustrate the varying degrees of government involvement in the promotion of technological innovation.

1. Developed market-economy countries

The rationale of government intervention in favour of technological innovation in market-economy countries is predicated on the need to correct market or institutional imperfections that interfere with economic efficiency. R and D and other innovative activities are often cited as examples of areas where market and institutional imperfections exist. Thus, it is argued that the inability of industry

to capture many of the benefits of its own R and D, as well as such factors as uncertainty, risk, and the need for large-scale investments, may lead individual enterprises to invest less in R and D than would be efficient when viewed in a broader context or from a "social" point of view.[128] Therefore, if left completely in the hands of enterprises not only might there be insufficient R and D carried out (insufficient in the economic efficiency sense that the total expected social benefits from more R and D exceed the expected private costs of more R and D) but also R and D might be geared towards inappropriate short-term goals instead of a long-term ones. For these reasons, it is contended that government action may be appropriate and necessary to redress such market and institutional imperfections.

Generally speaking, two kinds of policy approaches can be discerned with respect to government support to technological innovation in developed market-economy countries. In some countries technological innovation policies are seen as a major part of a process of indicative planning. This seems to be the case in countries - for example, Japan, France, and partly Italy - where innovation policy is used as an important instrument for economic policy and where the instrumentalities as well as the objectives of that policy are formulated through consultative and co-ordinative procedures and institutions within government and between government and industry. In other countries, such as the Federal Republic of Germany, Denmark and the Netherlands, technological innovation policy is seen as simply one component of general economic policy aiming to create a favourable climate for industrial development and international competitiveness. Although the latter countries also use technological innovation policy instruments, or even sectoral policies, these policies are not formulated within the framework of a national plan, nor are they used as selective policies in an intensive or systematic way. Similarly, in the United States, although innovation policies formally directed towards specific industrial sectors are non-existent, the development of two of the most important R and D-intensive industries there - computers and semiconductors - clearly indicates the crucial role played by the Government, especially the Department of Defense and sister organizations, in the promotion of technological innovation in the private sector (see chapter I and the semiconductors case study in Annex I). Moreover the United States Government has traditionally taken responsibility for the funding of basic research as well as regulatory action aimed at encouraging innovation.

The distinctions described above should not be seen as an indication of totally dissimilar approaches. Differences are often not as great as they would appear. Almost all developed market-economy countries grant enterprises some sort of compensation for undertaking selected large-scale projects involving high degrees of uncertainty. As pointed out in a study by OECD on the subject, even those among them that have traditionally placed great emphasis on the importance of the competitive mechanism in industry and eschewed an active interventionist role for government policies have none the less recently adopted new policies and started new programmes which undoubtedly enhance the role of public policy in relation to industrial innovation.[129] The two principal policy instruments customarily used for this purpose have been public procurement and financial support for innovation. More recently, emphasis has been placed on promotion of specific sectors under national and regional programmes.

(a) Procurement policies

Public procurement is often not formally directed towards the stimulation of innovation and does not inevitably lead to active public-sector effort to mould or stimulate technological advance. However, it can exercise a considerable indirect influence on technological innovation. In the United States public procurement has played an important role in influencing industrial innovation and industrial change in a number of industries during the past 30 or so years.[130] The reason for aiding these industries has largely been a by-product of the concern for national security. Public procurement, together with an explicit indication by the interested government organs of the required direction of technological advance, has operated as a widespread and finalized allocative mechanism of both productive and research efforts and has, consequently, played a crucial role in stimulating radical innovations

128 K.J. Arrow, "Economic welfare and the allocation of resources for invention", *The rate and direction of inventive activity: Economic and social factors* - A report of the National Bureau of Economic Research (Princeton University Press, 1962).

129 See OECD, *Policies for the stimulation of industrial innovation*, Vol. I, *Analytical Report* (Paris, 1978), p. 6.

130 See R. Nelson (ed.), *Government and Technical Progress: A Cross-industry Analysis* (New York, Pergamon Press, 1982), p. 460.

and the emergence of new sectors of industry in the United States.

In the 1970s, several other developed market-economy countries initiated programmes aimed at promoting the use of government procurement as an instrument for technological innovation. Examples are the Public Procurement and Technological Innovation Project of the Ministry for Research and Technology of the Federal Republic of Germany and the Commission on Public Procurement and Technical Development in Sweden. It appears from the work done under these programmes and the experience gained that in a number of traditional public-sector areas, such as defence and national security, public transport, health care, and energy conservation, governments have successfully used the procurement instrument to encourage industry to produce technologically improved goods.

(b) Financial support for innovation

Regarding financial support for innovation, it may be either direct, in the form of subsidies for R and D and other innovative activities, or indirect, in the form of tax credits to innovative firms. Tax credits are employed by a number of countries either to stimulate investment in a specific technology sector or as an incentive for incremental R and D expenditure. Tax credits for incremental R and D were introduced only recently in most countries. For example, in the United States, no tax credits for R and D existed until 1981. However, under the Economic Recovery Tax Act of 1981, a tax credit equal to 25 per cent of incremental R and D expenditures has been introduced. Likewise, in France, a tax credit equivalent to 25 per cent of the increase in the amount of the research effort from one year to the next was introduced in 1983. In Japan an R and D tax credit is provided for 20 per cent of the excess in current expenditures over the largest amount of such expenditures in any prior tax year. The Canadian tax credit amounts to 50 per cent of the increase in R and D costs (including investment in fixed assets) related to the average R and D costs of the previous three years.

The most widely used forms of direct financial assistance are: grants, risk-sharing investment and assistance with loans. Grants and risk-sharing investments are provided by almost all industrialized countries. Several countries have recently introduced new aid measures specifically devised to meet the needs of small and medium-sized enterprises, often regarded as an important source of innovation. The new measures are meant to counterbalance the tendency, observed under earlier financial schemes, to have funding concentrated mainly on R and D in large firms.

(c) Recent sectoral and regional programmes

In most Western European countries, government involvement in the promotion and encouragement of technological innovation is characterized by a higher degree of selectivity as compared to the United States, whereby public funds are directed into certain industries or areas of technology. Thus, the French Government, in a major re-organization and re-orientation of its science and technology policies in 1982, selected a number of strategic technologies to be preferentially supported from public funds for priority R and D, such as micro-electronics, energy, biotechnology, robotics and materials. This is to be implemented through "mobilization programmes" which, together with the "programme of technological development", are aimed at bringing about a synthesis between research and industry and directing national technological efforts to well-defined *filières* - i.e. integrated product areas extending from raw materials to finished products. The United Kingdom Government has also recently become very selective in channelling public funds to industries and, following the Alvey Report on a programme for advanced information technology, has released plans for the selective support of major collaborative projects in this area.

In the Federal Republic of Germany, although direct innovation-promotion programmes have recently decreased in favour of indirect measures, financial support to specific high-technology industries continues under project-programmes relating to energy research and technology, information technology, micro-electronics, biotechnology, civil aircraft, fast breeder development and high-temperature reactors. In this connection, an important role is played by the Federal Ministry of Research and Technology (BMFT), which has taken on the function of a sort of promotion and innovation-funding agency for industry.

The Japanese Government also carries out an extensive aid programme for new product and process development. Through the Ministry of International Trade and Industry (MITI), the Government is involved in formulating explicit national strategies towards innovation and industrial restructuring. Recently, the Government has substantially increased its

commitment to the promotion of innovation, mainly in the form of a few high-priority projects in such areas as amorphous semiconductors, large-scale integrated circuits, and fifth-generation computers. Projects are selected by MITI together with the firms concerned. Resources are then focused on the selected technologies in both national laboratories and the R and D laboratories of major companies, and the projects are supported through both public and private funds.

The European Economic Community has also taken a number of initiatives in recent years with respect to the promotion of innovation. A new chapter on "Research and Technological Development" has been added to the Treaty of Rome. A plan for a "European Technological Community" was approved by the EEC Council of Ministers in June 1985. High-technology research will be focused on 10 areas, including the incorporation into the plan of existing programmes. One such programme, ESPRIT (The European Strategic Programme of Research and Development in Information Technologies) adopted in 1984, aims at promoting joint research activities in information technology through collaborative projects taking place within EEC and partly financed by it. Another programme, BRITE (Programme of R and D in basic technological research and the applications of new technologies) adopted in 1985, aims to bring together technologies from a number of different origins for the benefit of specific industrial sectors, and to encourage the application of new technologies throughout EEC, particularly for the benefit of small and medium-sized enterprises. A third programme, also adopted in 1985, aims primarily at developing biotechnology in the Community through the establishment of an infrastructure for research, the elimination of bottlenecks preventing the exploitation by industry and agriculture of the material and methods originating from modern biology, and the experimental assessment of biohazards possibly associated with applications of biomolecular engineering.

The EEC countries fully participate also in the Eureka scheme for high-technology co-operation between 18 European countries. The main objective of the scheme is to increase the productivity and international competitiveness of European industries and national economies by the strengthening co-operation between enterprises and research institutes in the domain of high technology. Projects under the scheme will initially give priority to nine sectors, which include information and telecommunications and biotechnology. A particular emphasis is given, under the charter of the scheme, to the necessity of achieving an "internal market" involving the establishment of common industrial standards, the elimination of technical trade barriers and the opening of public procurement.

2. *Developing countries*

Direct promotion measures aimed at encouraging domestic technological innovation have also been enacted in recent years by a number of developing countries, mainly in South-East Asia and Latin America. These policy measures are aimed primarily at overcoming deficiencies in the effective utilization and adaptation of imported technologies, such as the gaps in knowledge about existing technological choices, the absence or scarcity of the capacity to make necessary modifications to imported technologies, and the weak links between science and technology institutions and the productive sector. They also have as their objective the strengthening of endogenous technological capacity through the establishment of specialized R and D institutions, the encouragement of R and D activities within firms, and the promotion of skill development. Most notable among them are: tax incentives, financial assistance schemes, and incentive schemes for the promotion of linkages between research institutions and the productive sector.

(a) Fiscal incentives

Tax incentives are not as widely used in developing countries as in developed countries for the encouragement of technological innovation. Only a few of those developing countries that have adopted innovation promotion policies have established tax incentive schemes. However, tax incentives for investment may also generally be applicable to capital investment on R and D. Developing countries with tax incentive schemes for the promotion of technological innovation include the Republic of Korea, Singapore, Malaysia, Mexico and Peru. In the Republic of Korea, firms with R and D expenditures are eligible for 10 per cent accelerated depreciation or tax credits are granted to firms which plan to incur fixed investment for R and D activities. Malaysia grants an investment tax credit of 50 per cent of qualifying capital expenditure for the use of improved technologies in agro-based industries, and a 33.3 per cent tax credit for capital expenditures on R and D. In Peru, industrial enterprises planning to incur an R and D expenditure exceeding the mandatory 2 per cent

of net income may deduct from their income tax up to 10 per cent of their net income, provided the research project is carried out in collaboration with Peruvian universities.

(b) Financial assistance

Financial assistance schemes are more widespread than fiscal incentives in developing countries. They have been established, among others, in Brazil, Mexico, the Republic of Korea and Singapore. In Brazil a public enterprise, the *Financiadora de Estudos et Projetos* (FINEP), established in 1967, is the main source of funding for technological activities in the country. Its action covers almost all the aspects of technological innovation, from product development to the establishment of R and D centres in private enterprises. One of the most important programmes of FINEP is the programme of support to the technological development of national enterprises - ADTEN - which provides funding for the technological innovation activities of Brazilian majority-owned corporations. Other mechanisms established by the Government for the financing of technological innovation include the innovation promotion programmes of the *Banco Nacional de Desenvolvimento Económico e Social* (BNDS), which provides grants to R and D projects and takes equity participation in firms in the process of expansion and diversification.

In the Republic of Korea, the Government has systematically formulated and implemented innovation support measures as part of overall economic development policies. Since the launching of the first Five Year Economic Development Plan in 1962, the promotion of technological innovation has been deliberately and methodically introduced into integrated development planning with a view to providing national industry with the means of reaching overall development targets. Thus, the Ministry of Science and Technology (MOST) was established in 1967 as a central government body responsible for science and technology development, and a series of laws aimed at promoting technological development were enacted to provide a legal basis for government action in this area. The Special Research and Development Projects Scheme created in 1980 provides financial support to enterprises for the development of technologies which require excessive capital investment or those which involve a high risk. The Government also established, in 1981, the Korea Technology Development Corporation (KTDC), with capital from both the Government and the private sector, in order to provide funds for a variety of technology development activities such as R and D, commercialization of R and D results, and prototype building. KTDC takes equity participation in new technology-intensive firms and provides "conditional loans" through which it shares the risk with the firms by requiring the payment of a percentage of the sales if the technology is successfully introduced into the market.

Singapore also is one of the countries that have attempted over the last decade to promote systematically the process of technological innovation in local industry through a network of incentive mechanisms and financial support schemes. To facilitate the implementation of the new industrial plan, adopted in 1979, various financial and tax incentive schemes were introduced by the Government to induce firms to innovate, diversify and improve their manufacturing processes. Thus, the Economic Development Board provides an array of tax incentives - such as double deduction of R and D expenditure, accelerated depreciation over three years for all plant and equipment for R and D and investment allowance of up to 50 per cent of the capital investment in R and D excluding building costs - and financial support for private firms' investment in technological innovation. The two most important financial assistance schemes are the Product Development Assistance Scheme (PDAC) and the Research and Development Assistance Scheme (RDAS). Under the former, the Government will bear equally with a local company (i.e. one with majority local shareholding) up to 50 per cent of the direct development costs of the proposed project; while under the latter a grant of up to 100 per cent of the approved direct cost of the project may be made by the Government to firms with specialized projects of unique economic and technological benefit to Singapore. The projects to be financed under these schemes must show that they belong to the category of "desired" or "priority" industry for Singapore, in keeping with government policies on industrial restructuring, which emphasize mainly the development of skill-oriented and capital-intensive industries in the country.

3. Socialist countries of Eastern Europe

In the socialist countries of Eastern Europe, it has been a matter of principle that the State has the right and responsibility to

elaborate, to guide, to implement and co-ordinate scientific and technological activities. The fulfilment of this principle is secured by the central role of the State in the distribution of the funds available for scientific and technological activities and by other co-ordinating instruments specific to the socialist economies. In the case of fundamental research, they have usually been inspired, organized, co-ordinated and supervised by national academies of sciences with large autonomous prerogatives.

Although important changes in the nature and organization of science and technology policies took place in the mid-1960s in practically all socialist countries of Eastern Europe, it was not until the early 1980s that the general philosophy of the science and technology policies was fundamentally questioned with a view to overcoming the major weakness of the system, i.e. the low speed of R and D output transmission to the production sphere. At present, the general trend observed in most of the CMEA countries is to remove the deficiencies in innovation activities, not by refining R and D structures and seeking new organizational organizations, but by increasing the interest of firms in applying new technology in their production activities. This is particularly so in Hungary, Poland, Bulgaria and the USSR. Another major objective of the science and technology policies of the socialist countries of Eastern Europe is the creation of the necessary support for the realization of the national and regional social and economic goals.

The specific science and technology priorities are different in individual socialist countries of Eastern Europe and they change over time. Some general patterns, however, can be detected. In the 1960s and 1970s, the major preoccupation was with traditional industries such as metallurgy, chemistry, machine building, food-processing. Currently, the major emphasis is on new and rising industries which determine the country's position in the international division of labour. They include electronics, computers, informatics, comprehensive automation (including robotics and flexible manufacturing systems), alternative sources of energy (especially atomic energy), development of new materials and technologies for their production and, finally, biotechnology.

The socialist countries of Eastern Europe have always attached great importance to intra-regional co-operation in science and technology. Such co-operation, administered largely since its inception by the Council for Mutual Economic Assistance (CMEA), used to be predominantly of a bilateral nature, but in the 1970s it moved towards multilateral associations with the adoption of the first Comprehensive Programme for Further Deepening and Improvement of Co-operation as well as the Development of the Socialist Economic Integration of CMEA members. This process became more pronounced with the adoption of the second Comprehensive Programme for Scientific and Technological Progress in December 1985.

B. Evolution of technology transfer policies

Implicit or explicit policies affecting the flow of and access to technology vary from country to country according to their economic system and level of technological development. Although laws and policies have long dealt with subjects which have a large impact on technology transfer and development (e.g. foreign investment, antitrust, intellectual property, science planning, education, foreign trade), it is only in recent decades that technology has been given attention by policy-makers as a subject in its own right.

In the 1960s, attention began to be paid in developing countries, particularly in Latin America and Asia, to explicit technology policies. National and regional action was accompanied by a number of initiatives taken by developing countries aimed at revising existing international standards in international investment, transfer of technology and protection of intellectual property rights. The international community began an active process of devising new or revised rules of the game concerning the activities of transnational corporations, on the transfer of technology, particularly to developing countries, and on the role of patents in the transfer of technology to these countries. Prominent among these initiatives was the work on the elaboration of an international code of conduct on the transfer of technology, which aimed to establish general and equitable standards among parties to transactions and the governments concerned, giving due recog-

nition to the special needs of developing countries for the fulfilment of their economic and social development objectives.

In developed market-economy countries - with the exception of a few countries in Europe and Japan - it was generally considered that technology is properly governed by market forces, the proper operation of competition rules (hence the importance of antitrust policies), and by the appropriate protection of intellectual property rights. Socialist countries of Eastern Europe did not explicitly deal with technology in their planning policies or foreign trade laws, although these policies and laws did affect technology transfer. This section reviews recent trends in transfer of technology policies with specific reference to some selected policy instruments.

1. Trends in developing countries

The technologically more advanced developing countries have pursued, in general, vigorous policies towards transfer of technology which have evolved over time. The late 1960s and the 1970s witnessed in a number of Latin American and Asian countries, and in a few African countries, the desire to exercise greater control over *foreign investment* and the activities of transnational corporations. In this respect, policies were pursued limiting the field of activity and share of ownership by external enterprises. A number of developing countries, in all regions, asserted national sovereignty over their natural resources, through nationalization or reversion policies. Many countries took steps to promote joint ventures with a view to reducing conflicts and securing greater benefits from foreign collaboration arrangements. It was also frequent to find policies - so called "performance requirements" - which established incentives in foreign collaboration agreements for export-oriented activities, training of national personnel, preferential schemes for local supply of goods and services and measures to facilitate the absorption and diffusion of foreign technology and development of indigenous technology.

Moreover, in a number of countries, *legal instruments dealing specifically with transfer of technology transactions* were adopted (e.g. Argentina, Bolivia, Brazil, Colombia, Cuba, Dominican Republic, Ecuador, Ghana, India, Malaysia, Mexico, Nepal, Nigeria, Peru, the Philippines, Republic of Korea, United Republic of Tanzania, Venezuela, Yugoslavia, and Zambia).

The adoption of specific laws and policies on technology transfer, such as Decision 24 of the Commission of the Cartagena Agreement of the Andean Pact countries, was inspired by concerns over the increasing burden of royalties on the balance of payments, the restrictions imposed upon recipients, and the widespread use of terms and conditions which were believed to reduce the national potential for the development of scientific and technological capabilities. Countries which established one or another type of screening procedures for foreign investment and/or transfer of technology put emphasis on controlling the costs incurred by the operation of foreign firms. Certain types of measures - particularly those limiting the remittances arising from foreign direct investments and payments for royalties and those restricting payments over excessively long periods or excessive prices in general - were adopted by many developing countries. Most prominent was the policy of limiting payments of royalties between a subsidiary and a parent company and the requirement that technological know-how could not be capitalized as an investment contribution.

Policy-makers were also concerned with settlement of disputes. Of particular relevance in this connection were the provisions laid down by a number of countries that disputes arising from technical collaboration agreements were to be settled by the laws and the courts of the host countries. Some countries also dealt with technology issues at a more sectoral level by linking technology transfer and local R and D to the development of a specific industry. Examples of this approach are to be found in the recent Brazilian experience in the informatics sector, and in policies pursued by the Republic of Korea, Singapore, Malaysia and Taiwan Province of China in promoting, in the early 1970s, their electronics industries.

Closely related to the general concern over the contribution of foreign collaboration to local development has been a growing interest in seeing that the *international patent system* acts as a stimulus to innovation, transfer of technology and industrial development. It was considered that, in its traditional form, the patent system had not functioned as an instrument for the development of developing countries and that the rights conferred by patents were often used to preserve import monopolies, without an effective exploitation of the inventions, or to impose restrictions in licensing agreements. It was observed that the granting of patents, overwhelmingly owned by foreign enterprises, could, in fact, hinder the establishment of local industrial and technological capacities. During the 1970s, a

number of developing countries, particularly countries in Latin America, India and Yugoslavia, introduced changes in the patent system. These changes generally tended to reinforce provisions governing the actual exploitation of patents. They also regulated the duration of patent protection.

The purpose behind the policies described above was the desire to internalize the benefits of foreign collaboration by reducing the possible detrimental effects of what was perceived to be an acute degree of foreign economic and technological dependence. The implementation of these policies has varied according to the more global economic policies followed by the respective countries. Most of the instruments are still in force but have undergone changes in their application.

In more recent years, a process of liberalization has set in, particularly with respect to foreign investment policies. This change has been accompanied by a more refined and sophisticated assessment of the role of foreign collaboration in the economy of host governments. However, it has been prompted, in a number of cases, by the debt crisis which has obliged some countries to liberalize measures governing foreign investment on the assumption that this would bring in much-needed foreign exchange. Thus, fiscal incentives and infrastructure facilities are being increasingly provided; limitations on the field of activity by foreign firms and ownership are being reduced; guarantees are being provided against nationalization and other forms of taking of foreign property; the policies on the control of costs (ceiling remittances, limitations on royalty payments between related parties) are being relaxed. Connected with these trends is the growing acceptance of international arbitration as a means of settling disputes in international economic transactions. A number of bilateral agreements on the protection and encouragement of foreign investment have been signed in recent years. At the same time, in 1985 the Board of Governors of the World Bank approved a Convention establishing a Multilateral Investment Guarantee Agency (MIGA), whose objective is to encourage the flow of investment for productive purposes, in particular to developing countries, by issuing guarantees to investors against non-commercial risks and by carrying out a broad array of promotional activities.

Changes have also taken place in recent years in several countries in developing and refining their transfer of technology policy instruments with the aim of enhancing the transfer and absorption of technology. The changes are aimed at easing the control of technology transfer transactions, in part because of the belief that national enterprises have acquired adequate bargaining capabilities in the negotiation of contracts. With the accumulation of experience in evaluating and screening contracts, governmental regulatory authorities also appear to have moved towards increased selectivity in the application of controls, thus leading, for example, towards a relaxation of screening procedures for contracts having minor economic importance. This easing of controls with respect to transfer of technology arrangements is particularly evident in a number of Latin American countries (Argentina, Mexico and the Andean Pact countries), India and the Republic of Korea.

In the intellectual property field, some developing countries have extended, or are about to extend (following recent trends in developed countries), copyright protection to computer programmes. There are also indications that a number of developing countries, particularly those that adopted more defensive strategies on patents, are reassessing the contribution of the patent system to local development, namely the incentives it might provide to secure financing for research and development. In some instances, such changes have been a response to demands made by their trade partners.

On the other hand, developing countries with a weaker technological base, mainly in Africa, and several Asian countries, have not made major changes in their approaches to technology transfer. They have maintained, generally, open policies towards foreign investment and liberal approaches to intellectual property protection. Technology transfers to those countries have generally been achieved through foreign investment and foreign assistance, so that those countries have not pursued an active policy on the scrutiny of transfer of technology transactions.

2. *Developments in developed market-economy countries*

In developed market-economy countries, technology transfer is governed by general principles of contract law under which parties are in principle free to determine the terms and conditions of arrangements. The government is usually not involved in the process of technology imports or exports, except in those instances where, for reasons of national security, international technology licensing is deemed to

be subject to an express authorization by the government. However, the application of antitrust law to technology licensing, with the avowed aim of preserving competition, has been widespread. Antitrust legislation is primarily directed against unreasonable restraints on trade. In developed market-economy countries, antitrust law in licensing agreements has substantially evolved in recent years, with a clear trend towards liberalization. At the same time, a tendency towards strengthening intellectual property protection in those countries can be perceived. Recent years have witnessed the adoption of treaties directed at reinforcing the protection of property rights. Copyright protection has been extended to computer programmes and a *sui generis* protection has been introduced in the area of integrated circuits. Protection is also being extended to biotechnological inventions.

Underlying these changes is a desire to strengthen the country's technological position and increase the international competitiveness of its firms. In this respect, a linkage has been forged between international trade and intellectual property policies. This recent concern has found its place in the new multilateral trade negotiations agenda. The recent Ministerial Declaration of the Uruguay Round has included, as one of the items for negotiations, the subject of trade-related aspects of intellectual property rights, including trade in counterfeit goods.

(a) Trends in the United States

Technology licensing has been traditionally scrutinized in the United States from the view point of competition and its link with intellectual property protection. In the late 1960s and early 1970s, the Antitrust Division of the United States Department of Justice listed nine types of restrictive clauses considered to be *per se* unlawful in licensing agreements. This approach, supported by the judiciary, was founded on the principle that such practices constituted barriers to the transfer of technology and impediments to competition. More recently, the perception has changed, particularly in response to the notion of strengthening the international competitiveness of United States firms. Technology licensing is being judged under the antitrust rule of reason, so that licensors have an opportunity to demonstrate the contribution of specific restrictions to such international competitiveness.

This general trend towards a more liberal application of antitrust policies in technology transactions has been accompanied by a series of important statutes adopted by the United States Congress and geared to strengthening or expanding existing intellectual property protection and licensing of technology in general - for example, by (a) enactment of the National Co-operation Research Act of 1984, whereby the application of United States antitrust laws to "joint research and development ventures" is substantially relaxed; (b) adoption of a *sui generis* legal system for the protection of "mask works" fixed in semi-conductor chip products; and (c) increasing the duration of the patent term for those instances in which certain federal regulations delay the commercialization of the invention (Patent Term Restoration Act). Intellectual property protection has been strengthened not only by the legislature, but by the Courts' extension of already existing copyright protection for computer programmes and data bases, and of patent protection for biotechnological inventions.

An important new development relates to the linkage being attributed to intellectual property protection and foreign trade. The United States Trade and Tariff Act of 1984 allows the President to take into account adequate protection of intellectual property as a condition for granting trade preferences under the generalized system of preferences. The Caribbean Basin Economic Recovery Act also envisages the granting of benefits to potential beneficiaries that provide adequate protection to United States' intellectual property rights.

(b) European Economic Community

Antitrust or competition law in the European Economic Community (EEC) is governed by the Treaty of Rome, article 85(1) of which prohibits agreements (or concerted practices) between two or more enterprises that restrict competition within EEC. Article 85(3) provides that an agreement that infringes article 85(1) may be granted individual exemption if the agreement meets certain conditions.

Recent developments in EEC parallel those in the United States, notably with respect to the liberalization of competition law. A new regulation on patent licensing agreements, which entered into force in 1985, exempts a number of restrictive practices in licensing and related know-how agreements that had formerly been prohibited. Another block exemption has been granted for joint R and D, joint exploitation of the results of research from prior collaborative efforts, and integrated R and D joint ventures (involving both R and D and exploitation). There are also indications

that a similar liberal approach is to be adopted concerning a group exemption for know-how licences.

(c) *Japan*

The evolution of Japan's policies on technology imports and foreign direct investment are also noteworthy, particularly because of their emulative effect in a number of developing countries. The role played by the Government has been particularly important. In the first instance, it played a major role in the acquisition of foreign technology in order to establish new industries. Secondly, it has provided important research and other service facilities for Japanese industries. Finally, it has played, until very recently, the role of watchdog over transfer of technology agreements by ensuring that they respond to Japan's best long-term interests.

Throughout the 1950s and early 1960s, the basic policy, as foreseen by the Foreign Investment Act of 1950, was to absorb as much foreign technology as possible through transfer arrangements but to minimize the direct inflow of foreign capital. The Japanese Government carefully screened technology agreements and approved only those with a reasonable promise of achieving the development and balance-of-payments goals set forth in this law.[131] The controls were exercised not only to channel foreign technologies into specific industrial sectors, but also to secure favourable terms and conditions in order to improve the bargaining position of Japanese firms.

The first in a series of liberalization measures was taken in 1967. In the technology sphere, the change has meant that contracts are approved, as a rule, unless they hamper Japan's national economy. Notwithstanding the liberalization, contracts for the importation of technology must be communicated to the Minister of Finance before their conclusion and, in cases where they contain restrictive provisions, to the Fair Trade Commission for the determination of their compatibility with the Antimonopoly Act.[132]

3. *Trends in socialist countries*

Technology transfer policies in the socialist countries of Eastern Europe are in general much more organically and closely integrated with overall economic policy and planning than those of the developed market-economy countries. The major thrust of the technology transfer policies of the socialist countries of Eastern Europe in the 1950s was a minimalization of their external dependency on technological supplies which had its justification in the climate prevailing after the Second World War. This attitude has changed since the beginning of the 1960s and a more liberal approach towards technological links with developed market-economy countries has been adopted - an approach manifested in the growing inflows of capital goods, licensing contracts and various other contractual (non-equity) forms of technology transfer.

The process initiated in the 1960s has been largely continued throughout the 1970s, with both a growing volume of technology being imported as well as increased diversification of the transfer mechanisms. Particular attention has been given to various forms of contractual arrangements, frequently referred to as East-West industrial co-operation agreements.

In parallel with this, at the beginning of the 1970s some socialist countries of Eastern Europe, and notably Romania and Hungary, had already begun to experiment with joint-equity ventures as a means for technology acquisition. The two were followed thereafter by Poland and Bulgaria. This process has been further intensified in the 1980s, with the result that recently joint-venture schemes are being given the utmost attention as a means both of attracting foreign technology to these countries and of overcoming their balance-of-payments difficulties. The extent of liberalization has varied from country to country, with Hungary, Poland and, recently, the Soviet Union making important innovative changes towards foreign collaboration. The recent decree on the operation of joint ventures in the Soviet Union constitutes an example of these new trends.

131 See T. Ozawa, "Technology imports and direct foreign investment in Japan", *Journal of World Trade Law*, vol. 7, No. 6, November-December 1973.

132 See Y. Ohara, "Regulations on transfer of technology in Japan", *International Review of Industrial Property and Copyright Law, Vol. 15, No. 2, 1984.*

C. Conclusion

1. *Innovation policies*

The evidence presented above clearly indicates the increasing importance attached by governments, especially those of developed countries, to the promotion of technological innovation and the development and application of promising new technologies. The policy adopted to this end sometimes involves governments themselves in planning, financing and managing large-scale programmes in various forms of collaboration with industry. Although, as explained above, the underlying aim of such policies is most often that of promoting the competitive advantage of domestic firms in key technologies and associated industries, their rapid spread might be partly ascribed to a growing trend which seems to substitute competition between countries for competition between companies. At the moment, there appears to be wide agreement that governments should promote innovation; however, differences exist as to the extent of the role that should be played by governments. These differences also reflect concerns over whether the policies pursued by some governments for the promotion of technological innovation give unfair advantage to their industries in international competition. Such differences may in the future grow into international trade disputes unless a greater international consensus can be achieved on the appropriate degree of government aid and support for innovation in domestic enterprises.

For most developing countries, there may be serious constraints on the extent to which the State could provide significant financial resources for the promotion of technological innovation. However, the role of the State in the mobilization of resources should not be minimized if developing countries are to make any major progress in this field. Such a role will need to be dynamic in nature, with clear goals, coherent policies and well co-ordinated instrumentalities.

2. *Transfer of technology policies*

The above review has revealed some broad trends. Developing countries with a certain technological base have adopted an active strategy for absorbing foreign technology through mechanisms which scrutinized transfer of technology transactions in order to assess their positive contribution to local development. Japan's policies in the 1950s and 1960s served as a model for this strategy. More developing countries adopted this approach in the 1970s and 1980s. Countries like China and Poland have recently introduced similar policies.

However, a trend towards more flexibility in the application of these policies has recently emerged. The experience gained by local firms in the acquisition of foreign technology and by the national authorities in the implementation of policies are important factors leading to the easing of controls in this area. Developing countries at lower levels of technological development have deviated little over time from their relatively liberal policies towards foreign collaboration agreements. The recent trend towards liberalization is more evident in foreign investment policies, where a number of developing countries, probably owing to balance-of-payments difficulties, have actively introduced incentives and a variety of mechanisms to promote and encourage foreign investment.

As for technology licensing, a noticeable shift towards liberalization in the application of antitrust law is clearly perceptible in developed market-economy countries. This is particularly so in joint research and development co-operation agreements.

Policy-makers are coming to pay great attention to intellectual property protection, particularly as it relates to new and emerging technology, such as informatics, semiconductors and biotechnology. Developed countries are laying great emphasis on the reinforcing of intellectual property rights and on linking adequate protection to trade issues. The latter trend may be the cause of acute tensions and conflicts with developing countries, particularly if access to markets is linked to an "adequate" protection of intellectual property in the developing countries.

In the socialist countries of Eastern Europe important changes have taken place in recent years. From a relatively rigid attitude towards technological links with developed market-economy country enterprises they have moved to a more liberal approach and open promotion of joint-equity ventures as a means of attracting foreign technology as well as overcoming balance-of-payments difficulties.

The changes that have taken place at the national level have not been accompanied by changes at the international level. Major initiatives to stimulate the transfer of technology on fair and equitable terms to both the supplier and recipient, such as the draft international code of conduct on the transfer of technology and the revision of the Paris Convention for the Protection of Industrial Property, have not yet reached a stage of completion.■

Chapter IV

TECHNOLOGY AND INTERNATIONAL COMPETITIVENESS

This chapter provides some empirical support for the proposition suggested earlier in this Report that levels and changes in the technological capabilities of various countries based both on imported know-how and endogenous research and skill formation are major determinants in the explanation of the patterns of trade for a country as a whole and for each individual sector. There are, however, "gaps" or differences in levels of such capabilities between countries and sectors. They affect trade patterns in two fundamental ways. Firstly, within countries, gaps between sectors favour specialization of production in those sectors in which the country has a comparatively greater technological lead or smaller technological lag internationally as measured by input efficiencies, product qualities and performance. Secondly, and even more importantly, international gaps within particular sectors lead to differences between countries in their shares of world exports in those sectors. In other words, according to this reasoning, the international competitiveness of a country's exports is closely related to its absolute advantage or disadvantage technologically compared with other countries.

The chapter is divided into two sections. Section A reviews the recent export performance of developed and developing countries and summarizes briefly the results of econometric research on the linkages between export performance and technology. Section B summarizes the more detailed analysis contained in Annex 1 of this Report of the relationship between techno-economic strategies of firms in different parts of the world and the evolution of their international competitiveness in five selected industries: semiconductors, television receivers, automobiles, iron and steel, and textiles and clothing.

A. Macroeconomic trends

The powerful influence of technology on national aggregate export performance is confirmed by recent empirical work based on 11 OECD countries over the period 1964-1980.[133] The analysis used growth in the number of external patents and a variable with which patent performance is highly correlated - labour productivity growth - as indicators of technology, and the rate of growth of exports as an indicator of trade performance. Patents do not capture the entire set of factors affecting the process of technological innovation and international diffusion since, as stated earlier in this Report, many innovations are not patented. Nevertheless, their strong association with national export growth is an indication of the importance of technology in explaining competitiveness. Attempts to test the influence of labour costs and other related variables did not produce significant results.

Turning to the sectoral trade patterns, in order to assess the influence of technology on trade performance of developed market-economy countries OECD and the World Bank have devised a taxonomy for classifying indus-

133 G. Dosi, K. Pavitt and L. Soete, *op. cit.*

Table 31

SIGN OF TRADE BALANCE OF DMECs FOR TOTAL MANUFACTURES AND FOR HIGH, MEDIUM AND LOW R AND D INTENSITY CATEGORIES OF MANUFACTURES, BY COUNTRY

Reporting country	*1970*				*1975*				*1980*				*1981*				*1982*				*1983*				*1984*				*1985*			
	T	H	M	L	T	H	M	L	T	H	M	L	T	H	M	L	T	H	M	L	T	H	M	L	T	H	M	L	T	H	M	L
Australia	-	-	+	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Austria	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+
Belgium-Luxembourg	+	-	-	+	+	-	+	+	+	-	-	+	+	+	-	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+
Canada	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+
Denmark	-	-	-	-	-	-	-	+	-	-	-	+	+	-	-	+	-	-	-	+	+	-	-	+	+	-	-	+	-	-	-	+
Finland	+	-	-	+	-	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+
France	+	-	-	+	+	+	+	+	+	-	+	+	+	-	+	+	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+	-
Fed. Rep. of Germany	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-
Greece	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iceland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	+	-	-	-	+	-	-	+	+	-	-	+	+	-	+
Italy	+	+	-	+	+	+	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+
Japan	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Netherlands	-	-	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
New Zealand	+	-	-	+	-	-	-	+	+	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+
Norway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Portugal	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	+	-	-	+	+	-	-	+
Spain	-	-	-	+	-	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	+	+	+	-	+	+
Sweden	+	-	-	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-	+	+	+	-	+	+
Switzerland	-	+	+	-	+	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-
United Kingdom	+	+	+	-	+	+	+	-	+	+	+	-	-	+	+	-	-	+	+	-	-	+	-	-	-	+	-	-	-	+	-	-
United States	+	+	+	-	+	+	+	-	+	+	+	-	-	+	+	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-

Source: see Annex table 8.

Note: T = Total manufactures; H = High R and D intensity; M = Medium R and D intensity; L = Low R and D intensity. For the methodology of classification into R and D intensity category see note *a* to table 32.

tries and product groups according to what is perceived to be their technology intensity or technology content.[134] The criterion used for this classification has been the relative importance of R and D efforts as measured by the ratio of R and D expenditure to production. Thus defined, *high* R and D intensity industries are aerospace, office machines and computers, electronics and components, drugs, instruments and electrical machinery. *Medium* R and D intensity industries are automobiles, chemicals, other manufacturing industries, non-electrical machinery, rubber and plastics and non-ferrous metals. *Low* R and D intensity industries include stone, clay and glass; food and beverages and tobacco; shipbuilding; petroleum refineries; ferrous metals; fabricated metal products; paper and printing; wood, cork and furniture; and textiles, footwear and leather. In addition, certain R and D intensive products belonging to the medium R and D intensity industries (coming from chemicals and machinery) are also classified in the high R and D group.

The aim of such a classification is, of course, to enhance the ability to measure the size and structure of "high technology" trade. There are, however, certain limitations to any summary measures of this kind, which suggest a measure of caution in interpreting the results. For example, the calculation of R and D intensity of an industry (ratio of R and D expenditures to total turnover or value of production) does not fully measure the technology content of the products manufactured by that industry, since (as suggested earlier in this part of the Report) industries may differ in the degree to which they rely on their own R and D efforts as distinct from utilizing technology from other branches or obtaining it from abroad. Moreover, the R and D intensities used in the classifications are weighted averages for the OECD region as a whole. Thus, inter-country differences in the importance of R and D-intensive exports need not necessarily reflect differences either in research efforts or in the intensity of other types of technology-related activity. Another limitation stems from the fact that the R and D-intensity estimates used in classifying products into the high-, medium- and low-intensity categories are averages over a given period (e.g. 1970-1980). A product classified in the low R and D-intensity group today may come from an industry in which R and D intensity was relatively high ten years ago.[135]

Although they account for a small proportion of total manufactures trade and of employment, even in developed market-economy countries, the products of high R and D-intensity industries (by the above definition) have tended to be among the relatively more rapidly growing exports for all groups of countries. Together, high and medium R and D intensity industries have been increasing their relative importance in total exports, whereas that of low R and D intensity industries has been falling.

A comparison of the significance of R and D intensive industries in the manufacturing exports of each country shows the United States to be the most specialized in such exports. They accounted for 34 per cent of that country's exports of manufactures in 1985, compared with an average of 16 per cent for Western European countries and 22 per cent for Japan.[136] The imports of the developed market-economy countries help to reveal how specialized are countries of other regions in this type of trade. For developing countries as a whole the share of high R and D intensive products in exports of manufactures is roughly as high as for Western Europe. Such exports represent a low proportion (about 5 per cent) of the trade of lower-income and African developing countries. Specialization in these products in exports to developed market-economy countries is also low for China and for the socialist countries of Eastern Europe.

In assessing the evolution of the competitiveness of countries and country groupings in the three categories of manufacturing industry over the period 1970-1985, use has been made of two types of measures based on OECD trade statistics. For developed market-economy countries only, table 31 and Annex table 8 show respectively the sign and size of trade balances - that is, exports minus imports, for selected years over the period. In the remaining tables competitiveness is measured by percentage shares of manufactured exports of individual developed market-economy countries in the total aggregate exports for each of the three categories of industry, and by the shares of different geographical groupings of countries in the total of developed market-economy imports. More precisely, the tables associate a

134 For a more detailed description of the methodology used for this classification, see OECD, *Selected science and technology indicators ..., op.cit.*, and "Commerce des produits de haute technologie": Première contribution à l'analyse statistique des échanges de produits de haute technologie", DSTI/IND 84.60, Paris, 31 January 1985.

135 For a more detailed discussion of these and similar problems of interpretation, see OECD, "Commerce des produits de haute technologie: ... *(op.cit.)*.

136 UNCTAS secretariat calculations based on United Nations Statistical Office trade data (Comtrade).

Table 32

DMECs: EXPORT SHARES OF MANUFACTURES ACCORDING TO R AND D INTENSITY CATEGORY, BY EXPORTING COUNTRY

(Per cent)

Exporting country [a]	*Share*			
	1970	*1975*	*1980*	*1985*
A. High R & D intensity				
Total DMECs	100.00	100.00	100.00	100.00
United States	29.59	26.88	26.15	26.79
Japan	8.29	9.50	12.41	18.33
Federal Republic of Germany	16.69	16.80	16.56	13.85
United Kingdom	10.46	10.54	11.77	9.15
France	7.01	8.61	8.55	8.05
Italy	4.78	4.50	4.59	4.26
Netherlands	4.76	5.17	4.20	3.80
Switzerland	5.56	5.22	4.25	3.35
Canada	4.90	3.10	1.98	2.70
Belgium-Luxembourg	2.25	2.83	3.10	2.24
Sweden	2.51	2.78	2.16	2.11
Ireland	.16	.41	.64	1.18
Austria	.82	.82	.61	1.07
Other [b]	2.21	2.84	3.04	3.11
B. Medium R & D intensity				
Total DMECs	100.00	100.00	100.00	100.00
Japan	9.36	11.04	14.68	20.17
Federal Republic of Germany	21.33	20.46	19.58	17.92
United States	19.88	19.05	16.32	15.60
France	7.84	9.25	9.11	7.32
United Kingdom	10.77	9.36	9.88	7.18
Canada	6.56	4.62	3.96	6.83
Italy	6.54	6.45	6.16	5.99
Belgium-Luxembourg	4.52	4.86	4.92	4.26
Netherlands	3.49	4.04	3.95	3.64
Switzerland	2.76	2.91	3.18	2.85
Sweden	2.50	2.67	2.30	2.20
Spain	.62	.99	1.44	1.58
Austria	1.02	1.22	1.18	1.21
Other [b]	2.80	3.09	3.33	3.25

(For source and notes see end of table.)

Table 32 (continued)

DMECs: EXPORT SHARES OF MANUFACTURES ACCORDING TO R AND D INTENSITY CATEGORY, [a] BY EXPORTING COUNTRY

(Per cent)

Exporting country [b]	*Share*			
	1970	*1975*	*1980*	*1985*
C. Low R and D intensity				
Total DMECs	100.00	100.00	100.00	100.00
Federal Republic of Germany	12.47	14.16	13.66	13.44
Italy	7.21	7.91	9.27	10.21
Japan	11.16	11.91	8.90	9.66
France	8.99	9.99	10.28	9.13
United States	11.02	9.36	9.62	8.98
Netherlands	7.27	8.29	8.33	8.33
United Kingdom	7.42	6.38	7.12	6.30
Canada	5.69	4.18	4.70	5.81
Belgium-Luxembourg	7.15	6.65	6.76	5.77
Sweden	4.27	4.06	3.46	3.54
Spain	1.66	2.05	2.50	3.30
Finland	2.33	2.05	2.53	2.51
Denmark	2.34	2.45	2.20	2.32
Austria	1.91	1.88	2.13	2.12
Australia	2.66	2.25	2.04	1.70
Switzerland	1.49	1.29	1.46	1.53
Norway	1.64	1.95	1.23	1.24
New Zealand	1.38	.89	1.07	1.11
Portugal	.85	.68	.82	1.10
Ireland	.72	.92	1.01	1.02
Other [c]	.39	.72	.92	.89

Source: UNCTAD secretariat calculations based on United Nations Statistical Office Trade data (Comtrade).

a The classification into R and D intensity categories is based on the methodology described in *Selected science and technology indicators: recent results, 1979-1986* (Paris: OECD, September 1986) and OECD "Commerce des produits de haute technologie: première contribution à l'analyse statistique des échanges de produits de haute technologie" (DSTI/IND/84.60), Paris, 31 January 1985.

b Listed in descending order of shares in 1985.

c Countries with a share of less than 1 per cent in total DMEC exports of the relevant category.

change in competitiveness with the direction of change of trade balances and market shares, respectively, over time.

Looking at *trade balances* for the three categories of industry over the period 1970-1985, Japan is the only country among the developed market-economy countries to show a surplus for high, medium and low R and D intensity industries (table 31), with absolute values substantially larger than those of the United States (Annex table 8). Only the United States, the Federal Republic of Germany, France, the United Kingdom and Switzerland registered surpluses for high R and D intensity industries for most of this period in parallel with deficits in low R and D intensity industries industries. In most countries, the medium-

intensity industries contributed significantly to maintaining trade in balance; the United States is alone in having earned a positive trade balance uniquely in high R and D intensity industries up to 1985.

United States' competitiveness, as measured by *export market shares*, declined somewhat in all three categories of industry between 1970 and 1985 (table 32). Japan's share of manufactured export markets more than doubled in the high- and medium-intensity categories, but fell in the low-intensity industries. The market share of Western European countries fell for the high and medium R and D intensity industries, but remained unchanged for low-intensity industries. In sum, the share of trade among developed market-economy countries as a percentage of total imports of such countries fell between 1970 and 1985 for high and low R and D intensive manufactures and fell between 1975 and 1985 for medium R and D intensive manufactures. Conversely, the market share of the rest of the world increased. It is almost entirely developing countries that account for this increase.

The competitiveness of developing countries' exports of manufactures in the markets of the developed market-economy countries rose in high, medium and low R and D intensive industries over the period 1970-1985, as measured by percentage shares of exports (see table 33). Although the rate of growth of these exports declined progressively over this period, the deceleration was less pronounced than for the rest of the world as a whole. Within the developing country group, the same pattern applies uniformly to major exporters of manufactures, petroleum exporters, Asian and higher per capita income countries. Though their performance is less impressive, most of the other developing country groupings also achieved increasing competitiveness for their exports in developed market-economy countries over much of this period. The market shares of Latin America rose over the entire 15-year period in both the high and medium R and D intensive industries, and fell between 1980 and 1985 in the low R and D intensive industries. The remaining developing countries generally performed well until 1980 but have experienced falling market shares since then. However, they managed to maintain or improve their position in low R and D intensive manufactures, mainly through the processing of raw materials.

The socialist countries of Eastern Europe also achieved increased market shares in the developed market-economy countries for all three categories of their manufactured exports during the decade of the 1970s. However, these shares have fallen since 1980. Starting from a fairly low base, however, China has managed to increase its penetration of developed market-economy country markets in the three categories of manufactures, a trend which has continued during the present decade of general deceleration in the growth of world trade.

What is most remarkable about the improved performance of developing country manufactures is that up to 1980, and with varying degrees, it applied to all major country groupings including the less industrialized countries, and to all three categories of manufactures, including those on both the higher and lower end of the spectrum with respect to R and D intensity.

Table 34 shows the evolution of market shares of developing countries' manufactures in the developed market-economy countries with a more detailed breakdown of product groups. In the statistical annex separate tabulations are shown of (1) market shares in the same product groups of the ten most important exporters accounting for two-thirds of total developing country manufactured exports to the developed market-economy region (Argentina, Brazil, Hong Kong, India, Malaysia, Mexico, Republic of Korea, Singapore, Taiwan Province of China, and Yugoslavia) and (2) those of all of the remaining developing countries. Developing countries as a group have succeeded in increasing their market shares in a wide range of products in all three industry groups between 1970 and 1985, although, as noted previously, this increase has tapered off since 1980. Apart from several resource-based manufacturing industries and other manufacturing (e.g. toys, musical instruments, jewellery, umbrellas and others) in which developing countries already had a substantial share of the market in 1970, they had by 1985 achieved market shares ranging from 10 per cent to 30 per cent in electronic components, telecommunications, electrical and non-electrical machinery (in both the high and medium R and D intensive categories), ferrous metals, fabricated metal products, and stone, clay and glass. Rapid growth can also be noticed in a number of other industry categories in which market shares are relatively smaller.

When the 10 countries singled out above are excluded from the trade figures (Annex table 9) the manufactured exports for the remaining countries, which represent the majority of developing countries, show a more modest performance over the period covered. Nevertheless, as a group these countries increased their market shares in developed market-

Table 33

MANUFACTURES IMPORTS OF DMECs BY R AND D INTENSITY CATEGORY AND MAJOR REGION OF ORIGIN

A. HIGH R AND D INTENSITY

Country or region of origin	*Market share (per cent)*				*Value ($ million)*	*Annual growth rate (per cent)*		
	1970	*1975*	*1980*	*1985*	*1985*	*1970-75*	*1975-80*	*1980-85*
World	100.00	100.00	100.00	100.00	158196	19.7	21.9	5.5
Developed market-economy countries	89.30	86.91	79.86	77.57	122712	19.0	19.9	4.9
Socialist countries of Eastern Europe	.61	.97	1.18	.55	863	31.5	26.7	-9.5
of which:								
USSR	.11	.29	.67	.23	363	45.6	43.9	-14.8
Socialist countries of Asia	.02	.05	.09	.13	199	49.0	36.4	13.9
of which:								
China	.02	.05	.08	.13	198	46.1	38.8	14.0
Developing countries	2.89	6.92	9.82	13.20	20887	42.5	30.8	12.0
By income group (GDP per capita)								
Less than $500	.20	.25	.62	.37	586	25.7	46.0	-4.8
$500-1500	.12	.36	.81	.95	1507	49.9	43.8	9.1
Above $1500	2.60	6.36	8.40	11.88	18801	43.2	28.9	13.1
By region								
Latin America	1.02	2.18	2.08	3.36	5315	39.4	20.7	16.2
Africa	.12	.18	.62	.33	525	29.8	56.2	-7.0
Asia	1.49	4.29	6.90	9.31	14721	47.8	34.0	12.1
Oceania	.00	.00	.01	.00	5		47.6	-6.5
By analytical group								
Major petroleum exporters	.74	1.85	1.80	2.82	4454	44.0	21.2	15.5
Major manufactures exporters	1.67	3.87	5.47	7.72	12209	41.5	30 .6	13.1
Least developed countries	.01	.04	.41	.19	307	53.4	96.2	-9.1
Remaining countries	.47	1.16	2.14	2.47	3915	43.7	37.8	8.6

(For source see end of table.)

Table 33 (continued)

MANUFACTURES IMPORTS OF DMECs BY R AND D INTENSITY CATEGORY AND MAJOR REGION OF ORIGIN

B. MEDIUM R AND D INTENSITY

Country or region of origin	Market share (per cent)				Value ($ million)	Annual growth rate (per cent)		
	1970	1975	1980	1985	1985	1970-75	1975-80	1980-85
World	100.00	100.00	100.00	100.00	371717	18.4	19.8	3.0
Developed market-economy countries	80.80	81.89	80.89	77.75	288994	18.7	19.6	2.2
Socialist countries of Eastern Europe	1.22	1.54	1.44	1.10	4083	24.1	18.3	-2.4
of which:								
USSR	.29	.47	.50	.36	1347	30.2	21.5	-3.4
Socialist countries of Asia	.16	.21	.29	.44	1642	24.9	28.2	12.1
of which:								
China	.16	.20	.29	.44	1633	24.4	28.8	12.2
Developing countries	4.80	5.03	6.72	8.95	33276	19.5	27.0	9.1
By income group (GDP per capita)								
Less than $500	.36	.46	.57	.58	2147	24.4	24.8	3.4
$500-1500	1.14	.99	1.08	.75	2806	15.1	22.0	-4.2
Above $1500	3.30	3.60	5.10	7.65	28454	20.5	28.5	11.8
By region								
Latin America	1.43	1.42	1.57	2.14	7970	18.2	22.3	9.7
Africa	.43	.26	.26	.27	1015	7.3	19.4	4.1
Asia	2.46	2.81	4.42	6.16	22886	21.6	31.2	10.1
Oceania	.30	.34	.23	.10	372	21.3	11.0	-13.0
By analytical group								
Major petroleum exporters	.62	.69	.85	1.30	4821	20.9	25.0	12.1
Major manufactures exporters	2.09	2.53	3.89	5.96	22155	23.0	30.6	12.2
Least developed countries	.12	.10	.08	.07	278	13.8	16.0	1.3
Remaining countries	1.97	1.71	1.90	1.62	6014	15.1	22.3	-0.2

(For source see end of table)

Table 33 (concluded)

MANUFACTURES IMPORTS OF DMECs BY R AND D INTENSITY CATEGORY AND MAJOR REGION OF ORIGIN

C. LOW R AND D INTENSITY

Country or region of origin	Market share (per cent)				Value ($ million)	Annual growth rates (per cent)		
	1970	1975	1980	1985	1985	1970-75	1975-80	1980-85
World	100.00	100.00	100.00	100.00	380955	19.2	17.0	-0.1
Developed market-economy countries	69.89	67.99	64.77	59.36	226137	18.5	15.9	-1.8
Socialist countries of Eastern Europe	3.66	4.44	4.69	4.48	17053	23.9	18.3	-1.0
of which:								
USSR	1.24	1.86	2.10	2.21	8408	29.2	19.9	0.9
Socialist countries of Asia	.54	.63	1.06	1.75	6655	23.0	29.8	10.4
of which:								
China	.52	.61	1.04	1.73	6584	23.2	30.0	10.6
Developing countries	15.80	18.83	21.21	25.13	95751	23.5	19.8	3.3
By income group (GDP per capita)								
Less than $500	2.25	1.84	2.23	2.51	9543	14.5	21.6	2.2
$500-1500	2.88	3.55	2.93	3.36	12809	24.3	12.6	2.7
Above $1500	10.68	13.49	16.07	19.28	73455	24.9	21.2	3.6
By region								
Latin America	6.33	7.01	6.81	6.55	24957	21.6	16.3	-0.9
Africa	1.76	1.68	2.07	2.33	8887	18.2	22.0	2.3
Asia	6.80	9.24	11.48	15.31	58316	26.7	22.2	5.8
Oceania	.18	.26	.17	.13	506	27.9	8.0	-5.3
By analytical group								
Major petroleum exporters	3.51	4.13	5.55	6.34	24150	23.2	24.1	2.6
Major manufactures exporters	5.76	6.82	8.72	12.31	46898	23.3	22.9	7.0
Least developed countries	.39	.32	.32	.34	1281	14.2	17.0	1.0
Remaining countries	6.07	7.56	6.62	6.15	23416	24.6	13.9	-1.6

Source: UNCTAD secretariat calculations based on United Nations Statistical Office trade data (Comtrade). For the methodology of classification into R and D intensity category see note *a* to table 32.

Table 34

DMECs: MANUFACTURES IMPORTS FROM DEVELOPING COUNTRIES, BY R AND D INTENSITY CATEGORY: MARKET SHARES AND GROWTH RATES

	Market share (%)				Value ($ million)	Growth rate (%)		
R and D intensity	*1970*	*1975*	*1980*	*1985*	*1985*	*1970-75*	*1975-80*	*1980-85*
High R and D	***2.57***	***6.28***	***9.19***	***12.39***	***21680***	***42.5***	***30.6***	***12.0***
Electronic components	11.20	21.58	28.97	29.14	5649	40.0	31.3	8.7
Telecommunication equipment	4.89	11.13	19.40	22.01	3445	44.4	33.1	11.0
Non-electrical machinery	1.64	3.47	5.94	15.67	3206	33.4	31.4	29.4
Electrical machinery	1.93	5.44	8.74	15.78	2897	46.0	30.1	17.3
Office machines and computers	1.34	6.80	3.92	8.93	2282	66.7	7.9	4.5
Scientific instruments	1.32	5.50	9.93	8.93	2146	59.5	34.6	1.2
Chemicals	.39	.52	3.80	4.25	1017	28.5	88.7	3.0
Aerospace	1.42	2.84	3.05	3.59	837	31.0	27.8	5.8
Drugs and medicine	6.91	8.31	6.96	4.66	0202	23.8	10.4	-5.5
Medium R and D	***4.38***	***4.56***	***6.39***	***8.43***	***35491***	***19.5***	***27.0***	***9.1***
Other manufacturing industries	16.90	14.92	15.70	25.43	10037	15.3	29.7	6.8
Other electrical machinery	5.43	10.16	15.95	18.78	7515	35.3	27.5	10.5
Other non-electrical machinery	0.67	1.31	2.35	5.95	5434	34.2	30.5	23.6
Other chemicals	4.47	3.98	4.37	6.23	5362	16.2	20.7	10.1
Motor vehicles	0.22	0.58	0.94	2.07	2751	21.6	26.2	12.4
Rubber, plastics	6.10	5.98	8.16	13.15	2263	43.5	32.4	20.4
Non-ferrous metals	30.24	33.86	41.44	31.94	1474	11.1	24.1	-14.2
Other scientific instruments	0.73	2.22	4.75	7.08	654	45.4	40.4	12.2
Low R and D	***15.65***	***18.62***	***21.02***	***24.83***	***99999***	***23.5***	***19.8***	***3.3***
Textiles, clothing, footwear, leather	19.01	25.86	30.46	38.16	38069	26.3	22.1	6.6
Petroleum refineries	37.64	36.25	39.55	38.92	28419	32.0	23.7	0.5
Food, drink, tobacco	25.11	24.97	20.34	20.42	16246	17.1	9.4	-1.3
Wood, cork, furniture	14.85	15.02	16.86	20.24	5374	16.4	24.8	2.0
Ferrous metals	2.86	3.52	6.03	10.68	4190	21.3	26.1	9.5
Fabricated metal products	2.47	4.05	7.73	13.37	3542	30.8	34.2	11.4
Stone, clay, glass	2.74	3.64	5.52	11.50	1911	23.8	29.8	15.9
Paper and printing	0.94	1.52	3.01	3.90	1486	28.9	33.7	6.2
Shipbuilding	4.08	3.99	12.21	21.70	764	23.1	28.4	3.7
Total manufactures	***9.54***	***11.57***	***13.41***	***15.74***	***157170***	***23.7***	***22.0***	***5.5***

Source: UNCTAD secretariat calculations based on United Nations Statistical Office Trade data (Comtrade). For the classification into R and D intensity categories see note *a* to table 32.

economy countries in most of the industry groups shown in the table and also managed to achieve a higher overall rate of growth of manexports than the latter countries.

Thus, it is easily seen that a tendency towards both convergence and divergence is revealed by the trade behaviour of the different country groups analysed above. There is (i) a very pronounced tendency towards convergence in export competitiveness between the United States and Japan and between developing and developed market-economy countries, as well as between the latter and China; and (ii) a similar but much less noticeable narrowing of the gap between the socialist countries of Eastern Europe and the developed market-economy countries. At the same time, among developing countries there is a growing divergence in manufactured export performance between a small group of major exporters of manufactures and the remaining countries.

According to some interpretations, these changes in trade patterns can be explained by the changing technological capabilities of the various countries in each sector.[137] A recent attempt to test for this association empirically, using overseas patents to approximate technology levels, has produced positive results. For more than three quarters of the 40 industrial sectors that were considered in this research, different degrees of innovativeness and productive efficiency performed as good predictors of the distribution of exports over a sample of 17 OECD countries for which comparable data were available. It was also found that changes in countries' innovativeness and input efficiencies explained to a significant degree long-term changes in their shares of world exports of manufactures as a whole.

The research showed that patenting is particularly powerful in explaining export competitiveness in those industrial sectors such as organic chemicals, pharmaceuticals, industrial machinery, electrical/electronic industries, and instruments, which are characterized by a relatively high degree of process and product innovation. It is of lesser significance in those mass production industries whose oligopolistic structures and competitiveness are also a reflection of innovations produced in other sectors and embodied in capital equipment, and of accumulated know-how in the management of complex product systems and in producing generally non-patented product designs. Innovativeness, as measured by patents, appears to be of no significance in explaining the competitiveness of industries such as agricultural chemicals, food processing, petroleum refining and stone, clay and glass, which are either not characterized by a high rate of innovation or whose trade performance is linked to the availability of natural resources.

As suggested above, other factors - both technological and non-technological - can also be expected to have an effect on export performance. The most important non-technological factors singled out by the research are the size and scale effects of large countries, proximity to the major foreign markets, input prices and the relative abundance of capital or labour in the economy. As an indicator of country size, population was found to exert the strongest effects on export shares in stone, clay and glass products, fabricated metal products, refrigeration and services machinery and motor vehicles, all industries in which scale economies are of some importance. Distance from foreign markets appears to be relatively important in most industries. However, what is most remarkable is that neither input prices as approximated by the unit wage cost nor the relative abundance of capital as approximated by the ratio of gross fixed capital formation to GDP (or to value added) are significantly correlated with export performance.

The influence of other technology-related variables on export performance, apart from patents (and R and D), has also been confirmed by the research, although it is difficult to separate the effects of technological innovativeness, in the strictest sense of the word, from those of labour productivity and degrees of mechanization (approximated by investment per employee). Together or separately, labour productivity and mechanization are shown to be of relative importance in mechanical engineering. They are also helpful in explaining competitiveness in several sectors that are dependent on other branches of industry (such as transport equipment and agricultural machinery) for their technology instead of, or in addition to, their own internally generated innovations. There is clearly a complementarity between intra- and inter-industry sources of technological change. Innovativeness in the pure sense, equipment-related technological advances and increasing mechanization or automation of production entail the creation of absolute advantages for some countries as compared with others in that they result in better products and/or unequivocally superior techniques of production.

137 L. Soete, "A general test of technological gap trade theory", *Weltwirtschaftliches Archiv*, vol. 117, 1981, and G. Dosi and L. Soete, "Technology gaps and cost-based adjustment: some explorations on the determinants of international competitiveness", *Metroeconomica*, vol. XXXV, October 1983.

It is undeniable that the recent shifts in relative exchange rates of several countries have exerted a strong influence on the current competitiveness of their industries. However, over time the macroeconomic adjustment process will tend to eliminate these advantages as prices and exchange rates move towards a new equilibrium. In the long run, evidence appears to show that the powerful impact of technological asymmetries between countries within given industries dominates over cost-related factors in the determination of trade flows.

B. Technology and competitiveness in selected industries

The industry case studies in Annex 1 of this Report highlight both the importance of technology in international competitiveness and the variety of ways by which innovation and imitation in production processes and products combine with firms' overall strategies and affect the international competitiveness of the various countries.

The semiconductor case study provides a good example of the importance of technological change for competitiveness in a science-based industry. It is a new industry (it started in the early 1950s) and is at the core of the so-called microelectronics revolution (nearly all electronics devices are based on semiconductors). In this industry, possibly the three most important factors which determine competitive success are (i) innovative leads (or, symmetrically, small imitation lags by the followers): coming first to the market with a new product (e.g. a new microprocessor oro, a memory) allows fast rates of market penetration and also the possibility of earning a significant premium in terms of company profitability (Intel is a good example of this strategy); (ii) learning curves, which in this industry are particularly steep: typically, the unit costs of the various devices fall with the cumulated volumes of output owing to pronounced learning effects in manufacturing as production goes on; (iii) innovations in process technologies: this relates to the "writing" of the circuits on the silicon chip, the automation of assembly of the components and testing (the Japanese success in the market for memories is a particularly good example). Certainly, technological progress inter-acts with companies' strategies in determining one country's trade performances. The two together provide a good explanation of the trends in exports and imports. So, for example, the United States had been running a significant trade surplus until the end of the 1970s, as a result of its innovative lead. Notably, the surplus was much higher on a company basis (i.e. United States-owned companies) than on a country-basis, the difference being the outcome of assembly operations of United States companies in third world countries and their manufacturing in foreign countries, especially in Europe. The Japanese trade balance has followed "cycles", strictly linked to that country's patterns of technological imitation/catching up, first in transistors, in the late 1950s, then in integrated circuits in the late 1960s and the 1970s.

The current Japanese trade surplus is closely related to Japan's position of near-leadership in the industry (especially in manufacturing technology, with the exception of the most advanced microprocessors, where the lead still rests with the United States). Conversely, the steady Western European trade deficit is largely the outcome of an average technological lag, especially in digital components.

TV sets and cars are two examples of more mature industries, where competitiveness has been based for a long time on manufacturing efficiency, economies of scale and international differentials in labour costs. In these industries, changes in the patterns of competitiveness have derived - in different ways - from organizational innovations (see the case study on automobiles in the annex for an account of the impact on productivity and product quality of the Japanese management practices) and from the opportunities of adopting, in the products and processes, innovations developed by other industries: in the case of TV sets, the possibility of incorporating semiconductor-based circuits in the receivers and of electronics-based automation of assembling and testing; in the case of cars, again, the possibility of incorporating electronics devices and new materials (plastics, ceramics, composite materials, etc.) and, even more important, the possibility of electronics-based automation of production.

The complex inter-actions between technical change and corporate strategies as joint determinants of competitiveness are particularly clear in these two industries. First, it may be noted that, especially in the case of TV sets, different companies, faced in the early 1970s with increased competition, could choose different combinations between efforts toward miniaturization of components/automation of production, on the one hand, and sub-assembly in low-wage developing countries, on the other. With hindsight, it must be said that those companies (especially Japanese and some European ones) which stressed the former strategy underwent a much higher rate of technological learning which proved competitively successful. Secondly, technological innovation *alone*, without complementary organizational changes, may well imply high costs with relatively little improvement in competitiveness: the recent American experience of "hyper-automation" in car manufacturing is a good example which can be contrasted with a Japanese "integrated" approach to production efficiency and flexibility. Thirdly, most of the time product innovations and process innovation go together: for example, increasing efficiency in TV assembly involves the reduction of the number of components and an increase in the content of electronics in the products, which in turn allows multi-purpose TV sets, etc.

Steel and textiles and clothing are obviously very different from each other, in terms of their product-markets, process technologies, efficient scales of production, production organization, etc. However, they have in common the fact that most of their technical progress relating to the processes of production (and to new intermediate inputs, such as new fibers, in the case of textiles and clothing) and innovation are to a large extent *embodied* in specific pieces of capital equipment. Thus, a fundamental dimension of competitiveness relates to the vintages of the equipment used and the efficiency of its utilization. In many respects, as shown by the steel and textile case studies (see Annex 1) the patterns of competitiveness are closely related to the strategies on investments and scrapping. So, for example, newer steel plants - even more so when coupled with lower labour costs - have provided a significant competitive advantage to newer entrants (e.g. Brazil, Republic of Korea). However, even in industries with these characteristics, a swift introduction of capital-embodied innovation and their efficient management may well compensate (or more than compensate) labour cost differentials: Canadian steel and Federal Republic of Germany and Italian textiles are cases in point.

Some other characteristics of these examples are worth stressing. First, it must be noted that, given some technological opportunity which may well be known to all companies (e.g. new types of looms and new steel-producing equipment), one still observes significant international differences in the corporate strategies when it comes to seizing these opportunities: a good example is the complacency of, and delay in modernization by, big American steel producers, which may be compared with the relatively quicker adjustment of some European and Japanese producers. Secondly, even in these industries where, as mentioned, price competition and process technologies are of the utmost importance, competitiveness based on *product* innovation is not negligible. This is obviously the case in clothing, where style and fashion can shield high-wage competitors and sometimes earn a big profit premium (see especially the Italian example). However, this is also true of the steel industry, where special kinds of steel with improved performance characteristics turn out to be a major competitive device. Thirdly, when process innovations are equipment-embodied and manufactured by specialized equipment producers, the learning process - for both machine-manufacturers and machine-users - is likely to involve the development of "special" user-producer relationships which are characteristics of specific countries (as is the case of the Federal Republic of Germany in textiles and textile machinery) and which are likely to become a major factor in international competitiveness that is not likely to occur if the equipment is simply bought off-the-shelf.

The case studies considered in Annex 1, as well as the more general picture of the industry patterns of competitiveness, show the importance of innovation, imitation, swift adoption of capital-embodied innovation, as well as of organizational innovations and firms' strategies, in the evolution of the competitiveness of companies and countries. In some cases, late-comers can learn, catch up and improve their competitiveness, by benefiting from the experience of the early innovators, by importing technologies - either directly or through the foreign investments of leading companies - and, sometimes, by exploiting a labour cost advantage. In other cases, an early innovative lead seems to reproduce itself over time, on the basis of the differential advantage of learning, cumulated experience, skills, R and D capabilities, etc. In these cases, changes in international competitiveness are likely to involve expensive efforts in research, training, acquisition of foreign technology and, quite often, varying mixtures of government policies.

No general pattern or "cycle" seems to be detectable in the evolution of technology and competitiveness in the whole group of industrial sectors. Contrary to expectations, for example, relatively old industries - such as machine-building - or even older - like textiles - show how developed high-wage countries (e.g. Federal Republic of Germany) can keep a sustained technological and competitive advantage through accumulated experience in machine-design and manufacture. Conversely, new industries such as small computers show how late-comers can quickly catch up and improve their competitiveness (as, for example, in the well-known cases of the Republic of Korea, Taiwan Province of China and Brazil). However, there is possibly one common feature of all cases of changing technological and trade competitiveness. This is the necessary process of company-specific and country-specific *learning* and organizational change which accompanies the change. Of course, this learning may be triggered and induced by very different factors: in some cases (such as Taiwan Province of China or Singapore) foreign direct investment has been a major vehicle of acquisition of technology; in other cases (such as the Republic of Korea, and even more so, Brazil, and earlier, Japan) the autonomous efforts of local companies, coupled with various forms of technology licensing and imitation, have been the major driving force. However, in all cases, national competitiveness has improved together with the development of local competence in manufacturing, design, organization management and, increasingly, with the development of autonomous creative R and D.■

Chapter V

IMPLICATIONS FOR THE FUTURE OF INTERNATIONAL TRADE AND DEVELOPMENT

Three main conclusions emerge from the four preceding chapters. The first is that, among the many forces which seem to drive international trade, technology is very important. Because of the spread of industrialization, it is becoming increasingly difficult to view trade as the mere outcome of specialization by countries trying to exploit inherited natural advantages. Rather, trade is determined by competitive advantage, and competitive advantage is itself created by the knowledge accumulated or generated by individual enterprises through learning and experience, through acquisition from other enterprises or entities, and through R and D. Although all three of these sources of knowledge are associated with technological innovation, it is the first which is the most important, because it is a necessary element in determining the ability both to adopt and to generate new knowledge.

The second conclusion is that the world has witnessed a growing trend towards convergence in the relative positions of the major industrial economies. A complex set of factors - not only technological, but also economic, political, historical and even cultural - have been influential in bringing about this convergence. The preceding chapters have concentrated on technology and have shown that a narrowing of differences in the level of performance in this sphere is generally associated with a decreased asymmetry in market shares in international trade. Thanks largely to their rapid technological progress, a small group of developing countries has also acquired, in a short space of time, the ability to compete with the international leaders in a wide range of product groups. In doing so, they have pulled ahead of most of the other developing countries, which have only just begun to develop the technological base needed for constant adaptation to the growing world market for new and improved products and services.

In acquiring this capacity, most developing countries remain asymmetrically dependent on the inflow of innovations from abroad. But then comes the third and somewhat disquieting finding from this Report: just as developing countries begin to find what appears to be a richer panoply of forms and sources of imported technology to choose from, the main indicators of the volume of international technology flows - foreign direct investment, capital goods imports, payments for licences and know-how, and official technical assistance - show either stagnation or a downward trend.

In the remainder of this chapter, some of the implications of these conclusions for developing countries are taken up.

A. A changed international environment

An increasingly multipolar world, in which no single country dominates economically or technologically, offers challenges and opportunities. The growing pressure of competition is manifest in many branches of industry, not only in the newer sectors such as electronics, where high R and D expenditures are linked with a dazzling stream of product innovations, but also in more mature sectors such as automobiles and basic steel, in which

process innovations are in part the end-product of inter-industry or (especially in the case of developing countries) international flows of technology.

The intensified rivalry among the leading industrialized countries, particularly between the United States and Japan, has important potential spin-offs for the rest of the world. Nowhere is this more marked than in the electronics industry, whose innovations have applications in almost every other industry. Fierce competition is driving down the cost of technology in its pure form generated by this industry and of the machinery, equipment and products in which it is incorporated. The vast potential of productivity gains arising as a result of this competition extends to all countries that are in a position to absorb the innovations. At the same time, this competition has contributed to the diversification of the international sources of technology flows, thereby expanding considerably the options open to technology importers. However, there is also a great risk that the heightened intensity of competition between Japan, United States, EEC and the leading developing-country exporters of manufactures will increasingly take the form of a technology war that is inconsistent with the continued expansion of world trade. The recent Japan-United States semiconductor agreement and the controversy over its application may be a case in point.

In the prosperous period between the Second World War and the early 1970s, so long as the role of the United States as the leading industrial power was undisputed, it was possible for "follower countries" to attempt to close their technological gaps with the United States by exporting to its large, homogeneous and relatively open market, while keeping their own markets relatively closed. The perception that the economic and technological distance between the United States and the rest of the world has shortened has combined with other developments to provoke a protectionist sentiment in this country which may make it unrealistic to assume that its vast market will continue to remain as open as it was in the past. In the absence of this channel for the growth of international trade there may be a need for consideration of some kind of alternative arrangements acceptable to all parties that will enable the succeeding tide of follower countries to achieve export-led technological and economic development.

Also conditioning the potential gains to be derived from the growing multipolarity is the interdependence that exists between innovation and growth. Although it is clear that technological progress is essential to the growth of output, the reverse is equally true. Favourable macroeconomic conditions in the short run are generally important for the creation of technological opportunities without which risk-taking and investment decisions cannot be motivated. Higher rates of economic growth favour quicker adoption of new equipment, higher levels of R and D, more rapidly expanding demand for new products and greater opportunities for exploiting economies of scale nationally and internationally. Therefore, generalized improvement in the state of the world economy through better international coordination of monetary and fiscal policies would seem to be a necessary condition for accelerating technological innovation.

As stated several times in this Report, all countries are dependent on external sources for some of their technological inputs. The asymmetric dependence of developing countries, however, must be seen in the context of the recent contraction in two of the most quantitatively important traditional measures of the international flow of technology to developing countries: capital goods imports and foreign direct investment. The slow-down in investment is most to be regretted in those instances in which it would have led to the creation or expansion of enterprises whose activity would have improved access to foreign markets or to otherwise unobtainable technological inputs with important spin-offs for the rest of the economy. The slow-down in capital goods imports (by nationally-owned enterprises) has more adverse implications because it is likely to retard the construction of important infrastructure projects and block the timely diffusion of modern technology which local firms are not yet in a position to supply and which is needed for raising the level of productive efficiency.

For most developing countries the prospects of a revival of these two major types of technology inflows are rather unfavourable for at least the remainder of this decade. Most projections point to a continued depression of commodity markets for years to come, thereby diminishing the traditional importance of the primary sector (especially minerals and petroleum) as the point of attraction for foreign investors. Low and uncertain export revenues, by prolonging the adverse economic conditions that have prevailed in many developing countries, also affect investor interest adversely.

Poor export prospects and the large debt overhang imply a continuation of the precarious balance-of-payments situation, which, in turn, deters both transnational corporations and private credit institutions (which might otherwise finance equipment imports) from in-

vesting in these countries because of the uncertainty whether foreign exchange will be available for servicing loans and investments. Even if technology flows derived from licensing and consultancy and engineering agreements, from small and medium-sized enterprises, and from South-South trade are less seriously affected, they will not be sufficient to offset the decreased flow of capital goods imports and foreign direct investment from developed countries.

Some countries have been resorting to different kinds of countertrade, such as buy-back arrangements, to finance machinery and equipment imports through contractually pre-arranged exports. At the present time, little is known about the extent of the use of countertrade for these purposes, although countertrade in general is reported to be growing in relation to total trade.[138] The advantage of countertrade arrangements is that they permit a country that has exports to get round the present shortage of bank lending for financing of capital goods imports. They do not, however, fundamentally increase a country's capacity to import capital goods and other necessities, which is determined by its overall balance of payments. In the years to come this capacity will be severely constrained for many developing countries for reasons that have already been given, unless some remedial action is taken. The documentation for UNCTAD VII (TD/328/Rev.1) has identified a package of policy options on financial resources for development, commodities and the international trade regime which, taken together or separately, could, *inter alia*, improve the capacity of developing countries to invest in the imported know-how needed to complement their own technological efforts.

B. The direction and impact of technological change

The types of technological changes that have recently been taking place also affect the future prospects for trade and development. It has long been recognized that the effects of technological innovation and change are not necessarily positive, as is amply demonstrated by the extent of environmental degradation. Moreover, the benefits and costs of such change are unevenly distributed. Radical changes in supply and demand patterns - both on the input and on the output side of the production process - induced by technological change are disruptive in the short run and impose strains on certain segments of society that can be quite painful to adjust to. Job losses in industries that are rendered obsolete by the changes are the most striking example. Countries that are willing and able to make the necessary adjustments to the disruption caused by technology do so because they recognize that it is the price that must be paid for continued economic growth.

Some less advanced developing countries are especially vulnerable to the potential adverse effects of technological change in the short run - effects which can also have important long-run consequences. The increasing rapidity of technological change, the difficulty of monitoring it and predicting its impact, only serve to compound this vulnerability. Socio-economic rigidities, lack of a well-skilled labour force, a limited industrial and technological base and a scarcity of financial resources are but a few of the reasons why these countries often find it more difficult than others to adapt to new conditions and modify existing patterns of production. The same deficiencies make it more difficult for developing countries to capitalize in time on the benefits of technological innovations. A continuously changing constellation of new products and services and improved production processes is creating both opportunities and challenges for all countries, but especially for developing countries. Perhaps the most significant for the years ahead are those associated with the two major technological trajectories identified at the beginning of this part of the present Report: materials economization and substitution and the microelectronics revolution.

As noted previously, the decline in materials intensity of GDP in the industrialized countries is one of the factors (together with the more significant effect of slackening in

138 See the study by the UNCTAD secretariat "Trade financing for developing countries: Some aspects of current difficulties and policy proposals" (TD/B/C.3/212), annex.

GDP growth) depressing the consumption of most non-food agricultural raw materials and minerals, ores and metals that are exported mainly by developing countries - a trend that is expected to continue for the foreseeable future. The gravity of this situation is greatest for those countries that depend the most on such exports and is compounded by the even more depressing effect of the sluggish growth of world GDP. It has been estimated by the UNCTAD secretariat that at least 84 developing countries receive more than 50 per cent of their export earnings from non-oil commodity exports.

However, in contrast to the developed market-economy countries, the developing countries have been increasing their consumption of non-oil raw materials more rapidly than GDP. This can be explained by their lower average level of technological development and by the high material content of basic wage goods and infrastructure expenditures, which count heavily in their GDP. It is doubtful whether the rising material intensity of developing countries' output is sufficient to offset the declining trend in the developed market-economy countries. The technologically induced decline in materials use lends special importance to action aimed at the diversification of commodity production, achievement of higher stages of materials processing within developing countries and related measures to increase the productivity and competitiveness of the primary sector and to develop new end uses for existing raw materials. In the latter connection, the efforts of some countries and groups of countries to set up specialized research and product development institutes deserve special examination. The ultimate challenge for primary producers is how to use their raw materials (and other commodity) sectors as a resource base for structural change involving a gradual shift from primary to manufacturing production. Technological accumulation and skill formation is an indispensable element of this transformation.

If one were to confine one's attention to the macroeconomic analysis of the recent trade statistics summarized in this Report, one would conclude that neither micro-electronics nor other forms of technological change have prevented developing countries - including both the leading exporters and others - from increasing the growth of their exports and generally enlarging their market shares in total developed market-economy countries' imports of a large range of manufactures. The reason for the contradiction with earlier predictions - i.e. that the diffusion of these technologies would have dire consequences for developing countries' exports - is not obvious. What is most likely, as suggested by some authors, and by some of the case studies in Annex 1, is that micro-electronics applications, including information technologies, have not diffused as rapidly in the industries of the North as was predicted on the basis of the speed with which such diffusion took place in the electronics sector itself.

The evidence from the case studies on electronics, automobiles and textiles and clothing, summarized in chapter IV, is that quality improvements, product development and cost reductions made possible by such innovations as computer-aided design (CAD), computerized integration of design and production or production and marketing, automatic insertion of circuits and automated manufacture of TV chassis, open-end spinning, shuttleless looms and laser-cutting robots, have eroded the competitive advantage that developing country exporters once enjoyed because of lower wage costs. To what extent this diminished advantage will be translated into a reversal of the hitherto favourable export performance of developing countries in these product groups is not easily predicted. However, among the factors to be considered in these and other product groups are those outlined in the following paragraphs.

Firstly, in the case of offshore production or assembly of manufactures in developing countries by affiliates of transnational corporations, the decision to relocate back to the North depends on an array of strategic factors in addition to labour cost. These include, for example, the importance of the domestic market of the host country for part of the affiliate's production, and the availability of financial resources for investment in a new plant elsewhere. They also include the availability of sufficient technical personnel with the knowledge and skills required to build and operate such a plant embodying the new technology, and the possibility of technological improvements of sufficient importance to maintain competitiveness.

Secondly, as mentioned previously, competition in the electronics industry is rapidly driving down the price of semiconductors and other electronic components that are being introduced into computer-based equipment installed in other industries. Those countries that have acquired sufficient technological mastery to be able to absorb these microelectronics-based innovations will be well placed to maintain or even improve their export market shares, whereas those countries (which may be the large majority) that lack the necessary skills, knowledge base and institutional flexibility to absorb and adapt the new technology

may fall behind. Research suggests that these contrasting circumstances characterize the capital goods industry in developing countries.

Thirdly, much depends on the product - the extent to which it is a traditional as distinct from a modern export for developing countries. The possibility of adopting some of the new technological innovations or of raising productive efficiency by making incremental improvements to existing technology, for example, is much greater for an industry like textiles and clothing, in which a number of developing countries have had virtually uninterrupted export experience dating back several decades, than it is for automobiles and electronics generally, in which genuine indigenous experience is lacking in most developing countries. Moreover, the investment requirements for setting up internationally competitive plants embodying the latest innovations in the latter industries would be prohibitive for most developing countries, especially when compared with the amount of employment generated.

Fourthly, as suggested by experience in the clothing industry, the more advanced developing countries may react to the technological challenges by licensing or sub-contracting production in other developing countries whose wage costs are lower than in their own or whose export quotas in developed market-economy countries' markets have not been exhausted.

Finally, markets are segmented. Within any industry there are always certain product groups or components that are simpler, easier to master technologically and relatively less expensive and which use relatively more labour. Developing countries, particularly the less advanced among them, may continue to be able to identify and exploit trade opportunities in such items at the same time as they gradually acquire the skills to produce more sophisticated products.

One plausible general conclusion that can be drawn from the limited present knowledge is that the diffusion of micro-electronics technology seems to herald neither a massive relocation of manufacturing production to the North nor a drastic deterioration of export prospects for the South generally. On the other hand, the greatly improved efficiencies possible with automated production and the associated advantages of being located close to component suppliers and to customers, coupled with the declining share of labour costs in production, tend to discourage large-scale investment by developed market-economy countries' firms in building new offshore capacity in developing countries in industries such as automobiles and electronics, which were once thought to be attractive possibilities for a large number of these countries.

Advances in microelectronics and information technology also have important implications for international trade in services. Communication via international computer networks allows transactions to take place at the same time but in different locations. Thus, the former barriers to trade in some services requiring direct contact between supplier and consumer can in part be overcome by computer links. New services may not be created, with the possible exception of data and software services, but a wide range of existing services are becoming more transportable across national borders.

The impact of information technology is particularly pronounced in banking, finance, insurance, accounting, consultancy and engineering, tourism and related services. In some cases the change has increased not only the degree to which services can be traded internationally but also the very nature of the services supplied. Innovation and the application of information technology in finance, for example, have led to the introduction of a vast array of new financial services and to a very significant increase in the degree to which financial services in general are traded internationally. Most of these activities are concentrated in the developed market-economy countries. The greater transparency of markets and access to information at lower costs as a result of computerized telecommunications have the potential of lowering barriers to entry and enabling specialized small and medium-sized firms to compete internationally. On the other hand, large firms with well-established and vast communications networks can benefit from the economies of scale offered by their existing capacity to reinforce their presence in international markets and broaden their range of activities in services. This applies in particular to services that are capital-intensive such as credit cards and data bases.

The situation of developing-country firms is at this stage less clear, although some appear to be able to exploit certain niches which have emerged, such as software development and data entry operations. Above all, what is required for participation in the world market for advanced services is a well developed telecommunications infrastructure. Most developing countries lack such infrastructures at present. Yet this may be an advantage because it facilitates "leap-frogging" to the most advanced, cost-efficient systems based on digitalized networks and on earth-satellite communications.

C. Some policy considerations for developing countries

If, as has been argued earlier, technology is the single most important factor in productivity change and competitiveness, any programme of structural adjustment and change needs to take into account the technology variable. This implies in turn the setting up of appropriate institutional mechanisms and policy instruments that integrate technology into the mainstream of macroeconomic management and policy-making. This task has so far proved difficult in most developing countries, mainly because of the tendency to treat technology as a partial or fragmented exercise, failing to see the important relationships between technology and other key economic variables. This requires a broadening of the horizon in national and international policy thinking and decision making in order to balance short-term interests and contingency measures with longer-term trade and development prospects.

There is, in particular, the danger that short-term economic adjustment policies may undermine the essential task of building up technological capabilities in the developing countries. Decisions on monetary, fiscal, credit and trade policies, among others, should be made taking fully into consideration their medium and long-term impact on the development of technological capabilities. If such capabilities are to be enhanced, resources available for research, development and engineering must be maintained or promoted; the difficulties encountered in the importation of capital goods that embody technological changes must be eased; and innovation must be encouraged by a policy environment which rewards risk taking.

The systemic character which the process of technological innovation has acquired in the industrialized countries, and which finds its expression in the firm-specific integration of a variety of technological inputs from various sources, has not found a similar expression in developing countries. In view of the predominance of non-R and D factors in the process of innovation in developing countries, government policies in this area need to be reoriented so as to make the utmost use of the potential of local enterprises for imitation and adaptation. Such re-orientation should adequately take into account the technological requirements of the productive sector so as to mobilize limited available resources for innovative activities to satisfy such demand. This implies more emphasis on the demand for innovation rather than the traditional approach of exclusively concentrating on supply-side aspects, such as the establishment of R and D institutes, whose record of performance in most developing countries has not been very encouraging.

Equally relevant in this context is the role of industrial property protection in the commercial introduction of technological innovation into developing country economies. Fuller consideration should be given to the trade-offs between the private-gain function of patents (as a means of appropriation of the benefits of innovative activity) and their function as a conveyor of information. Furthermore, in view of the "minor" innovations often arising from problem-solving and adaptive activities in developing-country enterprises, the use of such industrial property protection devices as "utility models" to encourage local innovative activities needs to be fully considered.

In view of the resource limitations highlighted above and the limited scientific and technological capabilities in most developing countries, it is necessary to examine once again the potential role that organizational changes and innovations, at both the firm and the sector level, can play in promoting economic growth. The extended use of management sciences in the organization of production - inventory management, resource allocation, industrial engineering techniques, manpower planning, production scheduling, energy conservation, plant layout, investment planning, management information systems, etc. - can make significant contributions to increase production and productivity in practically all developing countries. These changes do not necessarily imply large investments. In fact, minor technological innovations in the organization of production - such as process adaptations to local inputs, capacity-stretching measures, and product design modifications - constitute a vast potential source of improvements in productivity and of economic growth.

The changed international environment also poses additional challenges that must be met through increased co-operation among developing countries. Prospects for such co-operation have undoubtedly improved during the last decade, as shown in this Report. A group of developing countries has made rapid technological advances and they have become

major exporters of capital goods and consultancy and engineering services, mainly to other developing countries. These countries are also beginning to invest directly in other developing countries, transferring know-how and skills which are probably better adapted to the specific requirements and technological capabilities of these countries than those coming from traditional sources of technology. Subregional and interregional co-operation is also vital in pooling R and D capacities and innovation potentials, in particular in the light of the increasing complexity and costliness of R and D in many production sectors of the economy.

While there is much that can be done at the national level in managing technological change, it is clear that the extent of internationalization of the world economy is such that the strategies and policies of major developed countries and large transnational corporations have major implications for the policies pursued elsewhere, particularly in the developing countries. This, in turn, calls for a multilateral co-ordinated approach to technology for development purposes, in the interest of all countries and in particular the developing ones. The United Nations system, including UNCTAD, has played an active role in the promotion of international co-operation in the field of technology through research and policy analysis, technical assistance, and intergovernmental negotiations and discussions. There is a need to further sustain such international co-operation and to explore new possibilities for strengthening it in order to adapt to the changing international environment, the profound structural changes taking place in the world economy, the increasing interdependence and multipolarization of relations and the accelerating pace of technological change.■

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ANNEXES

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Annex 1

CASE STUDIES ON TECHNOLOGY AND COMPETITIVENESS IN SELECTED INDUSTRIES

Case 1: The semiconductor industry[139]

A. *Semiconductor development and applications*

The semiconductor industry is the foundation on which the entire electronics industry is built and lies at the centre of the microelectronics revolution that is transforming the nature of production and consumption throughout the world. Early research into semiconductor technology was undertaken principally with the sponsorship of the Government of the United States of America during the Second World War, in an attempt to find a replacement for the vacuum tube in radar applications, and by Bell Laboratories of AT & T. These efforts resulted in the unveiling in 1947 of the first transistor. The attempt to compact several transistors on the same component yielded the integrated circuit (IC) in 1961.

The first ICs were destined almost exclusively for military uses and in the space exploration programme. With the rapid expansion of IC production and the steep decline in the average unit price of ICs during the 1960s, other uses for ICs opened up, especially in computers. Yet it was not until the development of the metal oxide semiconductor (MOS) that large-scale integration became possible. In 1971 the microprocessor was developed, embodying on a single chip a complete information-processing circuit. The capacity of microprocessors has increased exponentially since then and reached one megabit by 1986, with capacities of 16 megabit foreseen by the end of the 1980s.

The application of ICs and microprocessors to other areas proceeded slowly at first, but with the continuous lowering of prices and increase in their efficiency the horizons for the application of semiconductor technology broadened to an ever-widening range of industrial, commercial, consumer and military uses. The semiconductor industry not only responded to an existing demand ("market pull") but also generated substantial new demand for its products' ("technology push"). New products have become available, applications which were previously uneconomic have opened up and other products which had reached the maturity stage of their life-cycles have been able to develop new characteristics. With the growing integration of chips, a new era is emerging where the dividing line between components, systems and software is becoming blurred, with major implications both for the nature of the semiconductor market and for the structure of the industry in the future.

[139] This section draws heavily on a United Nations Centre on Transnational Corporations publication entitled *Transnational corporations in the international semiconductor industry* (Sales No. E.86.II.A.1).

B. *Evolution and competitiveness of the industry*

The industry has evolved through several stages in response to changing technological factors that have affected the applications and cost of semiconductors and in response to the changing competitive environment in the industry itself. The dramatic development of the industry is revealed in the value of production of semiconductors, which increased from $400 million in 1959 to $1.9 billion in 1969, $5.4 billion in 1974, $15 billion in 1979 and $26.5 billion in 1986.

From the early 1950s through most of the 1960s, the principal firms were United States merchant - open-market or independent - semiconductor producers. Promising innovative opportunities, coupled with low barriers to entry, given the reduced level of investment required and the somewhat later availability of venture capital, led to the creation of many firms during this initial period. Over 30 firms were established over the 1966-1972 period alone.[140] During this period the United States firms also transferred technology to other developed market-economy countries through patent licensing or foreign investment. Japanese semiconductor companies were the most active licensees.[141] In addition to patent-licensing, a few Japanese firms also formed joint ventures with United States firms - an arrangement preferred by the Government of Japan to wholly-owned subsidiaries on the grounds that it was likely to foster greater technology transfer to Japanese firms. In contrast to the United States, Japan's industry has been dominated from the beginning by large integrated electronic companies. Thus, the major producers were also the major consumers.

In Western Europe, the semiconductor industry was also based mainly on large integrated companies. Nearly all had some type of joint-venture arrangements with the United States companies. But the main form of technology transfer occurred through the fully-owned affiliates of United States companies that were established during this initial period. The continued importance of these affiliates is reflected in the fact that by the mid-1980s they accounted for about half of the semiconductor production in Western Europe.

A new phase of the industry began in the late 1960s with the commercialization of ICs and their mass production, which enabled a pronounced reduction in production costs. Such reductions were confined primarily to the production phase of front-end wafer processing rather than the relatively labour-intensive assembly/packaging phase. To achieve cost cuts in the assembly/packaging operation, the United States firms, which still dominated world production, chose to invest in offshore assembly affiliates in developing countries and territories. The first company to establish an offshore assembly operation was Fairchild, in Hong Kong in 1962. By the mid-1980s, there were an estimated 120 offshore assembly affiliates in over 20 developing countries. The bulk of them, however, were located in a few countries which included, in order of importance, Malaysia (over 100,000 employees and $1.1 billion in exports of assembled components in 1983), Singapore, Philippines, Republic of Korea, Taiwan Province of China, Hong Kong and Mexico.[142]

Throughout the 1970s there emerged a distinct trend towards greater automation of offshore assembly on the part of United States semiconductor transnational corporations. Rising wage costs in many offshore assembly locations and the transition to very large-scale integration (VLSI) made assembly automation essential for technical as well as cost reasons. More automation in off-shore assembly was coupled with more final testing as well as mask-making in offshore plants. The decision to integrate forward into testing was motivated in large part by the need to shorten turn-around times as well as to economize on transport costs.

The Japanese semiconductor firms adopted a different approach to reducing labour cost by introducing progressively automated assembly equipment very early in their domestic facilities. Rising labour costs in Japan did induce a number of Japanese firms to invest in offshore operations in neighbouring countries. In contrast to the United States, this involved only a small percentage of their total assembly needs. A further distinction from the strategy of United States firms was that, since the Japanese semiconductor producers were also large electronic firms, they integrated their offshore semiconductor assembly operations with consumer electronics assembly in the same

140 D. Ypsilanti, "The semiconductor industry", *The OECD Observer*, No. 132, January 1985, p. 15.

141 Japanese royalty payments to United States licensors for semiconductor patents increased steadily between 1964 and 1970, from roughly $2.6 million to $25.1 million. (UNCTC, *op. cit.*, p.142.)

142 *Analyse fine des politiques d'industrialisation dans l'électronique* , Commissariat Général du Plan, Paris, 1987.

overseas location, in order to serve both the local and the export market.

Except for a few of the largest producers, Western European semiconductor firms have not generally relied on offshore subsidiaries to satisfy their assembly needs. They have tended to rely either on home-based assembly or on independent assembly by subcontractors in developing countries. Those firms that have opted for home-based assembly have been principally captive semiconductor producers not faced with the same competitive pressures to lower assembly costs as were merchant producers. Assembly subcontractors, on the other hand, have provided several smaller Western European firms - as well as smaller United States and Japanese firms - with an alternative to foreign direct investment in assembly capacity when the volume of their shipments did not warrant the latter.

The last phase of evolution of the industry began in the latter part of the 1970s and has continued until today with the unrelenting speed of IC product and process technology development. This period is marked by an increased competition between United States and Japanese firms, which taken together accounted for about 90 per cent of world production and about 73 per cent of world demand in 1986 (table A1). The higher rate of growth of the Japanese semiconductor industry over a prolonged period resulted in its overtaking the United States industry for the first time in 1986. The reasons were multiple but an important one was that Japanese firms proved to be the most effective in exploiting new product and process technologies - many of which originated from United States firms - in both semiconductors and electronic products.[143] Western European firms continued to lag behind, partly owing to the difficulties the large European electronics companies, unlike their Japanese counterparts, had in adjusting their conglomerate production structures to accommodate microelectronics.

Four main trends have defined the industry in recent years and are likely to determine its future development. They are outlined below.

(a) Increased concentration and captive firm production

Large electronics firms incorporating more and more microchips into their products have sought to acquire greater control over chip technology by integrating backwards into IC manufacture. Since they had the funds for R and D but lacked the technology, whereas many of the merchant semiconductor firms were in the opposite situation, the advantages of joining forces were apparent. The wave of takeovers and mergers occurring during the late 1970s left only a few independent IC producers in the United States. By 1983, of the ten major semiconductor producers in that country, only two could claim the status of independence. Several of the acquiring firms were Western European companies seeking to close the technology gap with the United States and Japan. Since the Japanese semiconductor producers were in most cases already divisions of very large electronic equipment companies, the wave of mergers and takeovers was more limited in Japan. The shift towards more captive production led to the emergence of smaller specialized firms offering a range of services related to IC production, such as R and D, design, mask-making, silicon foundries, testing and assembly services.

(b) Inter-firm linkages and co-operation

The search for technical co-operative links has been pursued by all semiconductor producers probably more than in any other industry, irrespective of nationality or operating structure. Such joint ventures are principally intended to avoid duplication of R and D efforts and to capitalize on different firms' technological expertise, with the ultimate aim to economize on R and D costs and remain afloat in a highly competitive market. This is a logical outcome of the rapid pace of innovation in this industry, which not only required ever-growing R and D budgets but resulted in more obsolescence of existing processes and equipment.[144]

All major producers have developed one or several equity or technical linkages with other firms. As barriers to entry have in-

143 Japan Economic Research Center, *The Japanese Economy and the Microelectronics Revolution*, Tokyo, 1985, p.11.

144 Minimum investment requirements for semiconductor production jumped from $500,000 in 1967 to $5 million in 1976 and about $60 million in 1982 (D.Ernst, "Automation and the worldwide restructuring of the electronics industry: strategic implications for developing countries", *World Development*, Vol.13, No.3, 1985, p.336). "Many companies are ploughing back at least 25 per cent and some as much as 35 to 40 per cent of their sales on investment costs together with R and D expenditures. At the same time the investment pay-back periods are also shrinking. Twenty years ago a chip would take two to three years to develop and have a life span of five to ten years. Nowadays, the development time is 12 to 18 months, the life span is two to four years." (*Financial Times*, 1 April 1987).

Table A1

WORLD PRODUCTION OF SEMICONDUCTORS BY ORIGIN OF FIRM [a] AND MARKETS, 1986

(Millions of dollars)

Origin [a]	*Total production*	*Major markets*				
		United States	*Japan*	*Western Europe*	*Rest of world*	*Share of world market (per cent)*
United States	11700	7150	1000	2550	1000	44
Japan	12100	1200	9500	600	800	45
Western Europe	2350	300	50	2000	..	9
Rest of world	350	50	50	50	200	2
Total	26500	8700	10600	5200	2000	100

Source: Motorola Marketing Research, 1986 reproduced in *Financial Times*, 1 April 1987.
a "Origin" in this table refers to country of ownership.

creased, with the growing maturity of the industry and exploding investment requirements, the unilateral transfer of technology through licensing has been largely replaced by technical arrangements. The arrangements often involve national and international co-operative ventures for the joint development of product families with an exchange of licences as well as masks, design information and test tapes to enable the two firms involved to make each other's products. One example of this co-operation is the ten-year pact signed between two United States firms (Intel and AMD) for the joint development and production of the 16-bit microprocessor family. Technical arrangements of a similar kind have abounded between Japanese firms. European firms, on the other hand, have resorted primarily to links with non-European partners, probably because they view them as leaders in the industry.

Technical co-operation goes beyond individual firms and has evolved into nationwide consortia. R and D consortia have been a common feature of the Japanese semiconductor industry for a number of years. These arrangements developed later in the United States but are gaining momentum. For instance, by the end of 1981, a consortium of 16 semiconductor and computer firms had pledged $12 million to a new Center for Integrated Systems at Stanford University. A different type of co-operation has recently evolved in developed countries between chipmakers and systems manufacturers, even where firms have no equity links to one another. The need for such co-operation arises from the advantages to be derived by both parties in co-ordinating the design of the circuits with the design of the equipment into which the ICs are incorporated.

(c) Patterns of investment flows

These technological and competitive forces have altered the patterns of international investment in the semiconductor industry. The trends towards assembly automation, combined with excess capacity in developed market-economy countries, resulted in a slow-down in offshore assembly operations in developing countries. The value added of offshore assembly, which increased until 1973, declined during the ensuing decade. With a new upswing in world demand in 1983, investment in offshore assembly, including automated assembly and final testing, started to gain momentum, only to decline again in 1985 after a new fall in world demand. The shifting of locations, however, has been minimal; the overwhelmingly large share of such operations continued to be concentrated in fewer than a dozen developing countries, especially in South-East Asia. The key considerations are low-wage unskilled and skilled labour, labour stability, good transport

and telecommunications infrastructure and, in some cases, government incentives.

The bulk of foreign direct investment by semiconductor transnational corporations since the late 1970s has been in the major developed country markets. Greater emphasis on foreign direct investments was placed on exports to major markets because of the need imposed by higher levels of circuit integration for closer co-ordination between chipmakers and equipment manufacturers, and to a lesser extent as a way of circumventing tariff and other trade barriers. First, United States firms and, more recently, Japanese ones have established semiconductor facilities within the European Economic Community. Similarly, most of the major Japanese firms have invested directly in the United States, because of the unwillingness of many United States electronic firms to rely too heavily on foreign chip sources and the desire to ease growing trade frictions between the two countries. Conversely, a number of United States companies are now either constructing or planning their own manufacturing facilities in Japan. Such interpenetration in each other's home markets presumably served the additional function of enabling them to monitor more closely one another's technology.

(d) Increased government support to the industry

Promotion of the semiconductor and computer technologies has become a central element of science and technology policies in many developed, and also several developing, countries. The support is not justified by the employment the industry provides or its value added to the economy at present, but rather by the fear that the future growth of the economy and its competitiveness will be severely handicapped if the national semiconductor industry is not developed. As discussed in chapter III above, the promotion measures adopted by governments vary widely from directly financed participation to government procurement and R and D assistance.

In Japan, a key to the promotion policy has been the support to joint Rand D schemes among Japanese electronics firms. The United States Government support has not been through direct industrial policies but rather through its military and space programmes. The most recent one is the Very High-Speed Integrated Circuit Programme (VHSIC) in support of research over a 10-year period which began in 1980. In Western Europe, in addition to the national programmes, the European Economic Community is promoting ESPRIT (European Strategic Programme for R and D in Information Technologies) aimed at increased co-operation in exchange of information and R and D among European firms and between firms, universities and research laboratories. The emphasis of the research will also be on high-speed and very large-scale integrated circuits.

Recent developing country efforts fall within the framework of policies to promote local production of semiconductors to supply the national consumer and industrial electronics industry. Taiwan Province of China and India have provided financing for the establishment of production and distribution companies to carry out R and D and manufacture semiconductors. In the case of Taiwan Province of China, the company has even diversified into the production of custom chips through establishment of an affiliate in the United States. In the Republic of Korea, the emphasis has been on financing a major research programme backed by a government technology institute to upgrade the local electronics industry's semiconductor process technology. Brazil's approach was more radical in that it instituted a "market reservation" policy for digital ICs intended to promote the development of local suppliers.

Another type of government support to the industry is the one reflected in the recent Japan-United States semiconductor agreement. The measure, which is designed to halt allegedly unfair pricing of Japanese chips in the United States market and elsewhere, sets minimum prices for certain Japanese-made chips sold in any country other than Japan, and commits the Japanese Government to help United States companies sell more of their chips in Japan. Critics of the agreement view it as a means of protecting United States semiconductor manufacturers who have lost their competitiveness in world markets; while supporters see it as an attempt to ward off below-cost dumping of Japanese chips in the United States and other markets.

Case 2: The television receiver industry

A. *Structure of world production and trade*

The TV receiver industry is part of the consumer electronics sector, generally understood to include different products ranging from radio receivers to electronic calculators.[145] The products of the industry are essentially the monochrome and colour TV sets, with variations in screen sizes and functions.

World production of TV receivers is concentrated in a few geographical regions whose share in total output has undergone significant changes over the past two decades. This has been reflected in the declining production share of the major developed country manufacturers and the emergence of developing country producers. Of a world production of 70 million units of TV sets in 1982, the share of the United States was about 15 per cent (down from 33.5 per cent in 1965) and that of EEC stood at 16 per cent, compared to 25 per cent in 1965. The corresponding share of the socialist countries of Eastern Europe also declined, from 18 per cent to 16 per cent, and that of Japan dropped from 28 per cent in 1970 - its largest share during the period 1965-1982 - to about 18 per cent in 1982.

In contrast, the share of the developing Asian region increased dramatically, from 0.2 per cent in 1965 to about 15 per cent in 1982. These changes have taken place against the background of declining growth of world production. The average annual rate of growth of world production during 1975-1982 was about 3 per cent, down from 6 per cent for the period 1965-1975.

The declining world production shares of the individual developed countries has been accompanied by a decline of their shares of world exports. Between 1970 and 1982, the share of the United States went down from 7 per cent to 5 per cent, that of EEC dropped from 31 per cent to 29 per cent and of Japan from 47 per cent to 37 per cent. In contrast, the higher share of developing countries in world production has been reflected in their increased presence in foreign markets. The share of these countries has more than doubled, increasing from about 9 per cent to 24 per cent. The bulk of this increase, however, was accounted for by three Asian exporters, namely Republic of Korea, Singapore and Taiwan Province of China. Part of this increase has been reflected in the expansion of South-South trade.[146] However, the pattern of this trade within the developing regions is unidirectional as it has been dominated by exports from a few Asian developing countries to other developing countries in Asia, Latin America and Africa.

The competitiveness of developing country exporters has also improved in developed country markets. An increasing proportion of developed-country imports of TV receivers has originated from the developing countries. Between 1970 and 1985, the share of these countries in EEC imports of TV sets rose from 0.42 per cent to 11.68 per cent, as compared with an increase from about 18 per cent to 54 per cent in United States imports. Improvement of the competitiveness of developing countries has been reflected in their export performance in the two main products of the industry. Most strikingly, more than 60 per cent of developed market-economy countries' imports of monochrome TV sets came from developing countries in 1985, up from 52 per cent in 1978, and 30 per cent of the corresponding imports of colour TV sets originated in developing countries, compared to 10 per cent in 1978.

The present structure of world production and trade was brought about by a combination of factors that influenced the strategies of the leading manufacturers of TV sets in domestic and export markets. Technology has undoubtedly been a principal, but not the only, factor that explains international competition in the industry. Other factors, such as labour and capital costs, availability of skilled personnel, raw materials and components, government policies, and exchange-rate fluctuations, have affected the strategies of TV producing firms.

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145 This sector includes products such as television receivers, video cassette recorders, video-discs audio tape recorders, automobile tape players, high fidelity stereo, several electronic components such as picture tubes. It generally refers to the following product groups in the SITC (Rev.2): 761.1, 761.2, 762.1, 762.2, 762.8, 763.1, 763.8, 776.1, 776.2, 776.3, 776.4 and 776.8.

146 The import share of Latin America from developing countries increased from 10 per cent to 22 per cent, of Asia from 10 per cent to 16 per cent and of Africa from 8 per cent to 14 per cent.

B. *Technology and other factors affecting the strategies of major producers*

It was in the United States that the TV receiver industry was first developed and a market for this product was created. This goes back to 1939, when the United States firm RCA pioneered the development of the TV technology that led to the appearance of the first monochrome set in the United States market in 1946. This was followed by the commercialization in 1954, again by RCA, of the colour TV technology. Eager to exploit their lead in this technology United States firms (RCA and Zenith) licensed their technology to European and Japanese firms. In the period 1960-1967 about 200 licensing agreements were concluded between United States firms, particularly RCA, and Japanese companies, reflecting the large inflow of United States TV technology into Japan.[147] In Europe the diffusion of colour TV technology started 10 years later owing in part to difficulties in agreeing on a European standard for colour transmission.

A few very large companies control world production and markets. Among the top ten colour TV manufacturers in the world for 1982 were five Japanese, two United States and three European firms. Their behaviour has been characterized by product differentiation through frequent design changes and other means, including sales by some manufacturers under different brand names made possible by mergers and take-overs. This is exemplified by the behaviour of the French firm, Thomson, which acquired between 1980 and 1983 three firms in the Federal Republic of Germany (Saba, Normende and Telefunken) and of such Japanese firms as Matsushita and Sanyo, which took over two United States firms, Quasar and Warwicks, around the mid-1970s. The Dutch firm, Philips, has also had a similar strategy in its worldwide activities. As a result, geographical concentration has been accompanied by concentration at the industry level in individual markets.

Whereas United States and European firms produced large-screen TV receivers, Japanese companies have, for reasons of limited space in households, concentrated their production on small-screen TV sets, thereby initiating a process of miniaturization. This change in product technology has contributed to enhancing the competitiveness of Japanese exports mainly during the 1970s, when a structural shift in the pattern of TV consumption occurred, particularly in the developed market-economy countries. This shift has been reflected in the alternative uses of the TV set, which transcended its original use as a broadcast receiver to a display device for many purposes, including that of personal computers. This, together with lower prices of TV receivers and higher income levels, resulted in an increase in multiple purchases of TV sets and a change in consumer preferences towards small portable models that correspond more to the characteristics of the Japanese products.

To adapt to changes in consumer preferences, the United States and EEC producers, as well as manufacturers from developing Asia, adopted the miniaturization process in their efforts to compete with Japanese firms in international markets. International competition has also been reflected in successive improvements by international firms of the image definition and the addition of new functions, such as remote control, teletext, videotext and videodiscs, which allow the TV receiver to be a means of access to a variety of information services.

Apart from product differentiation, major producers have pursued different strategies in their attempts to increase their share of the export market. Whereas Japanese companies have concentrated on process innovations, namely the perfection of the technology of automatic insertion and testing of electronic components on the printed circuit board, United States firms have - in the face of mature domestic demand since the late 1960s - moved their TV assembly operation and part of their components production to third-world countries, particularly Mexico, Taiwan Province of China and Singapore. The driving force behind the shift of United States firms to low-cost developing countries was to cut production costs and re-import TV receivers and sub-assemblies in an effort to improve the competitiveness of United States products. What may have encouraged this move is (i) the lower labour costs in the developing countries; (ii) item 807.00 of the United States Tariff Schedule, which allows United States firms to export components for further processing abroad and re-import them while paying duties on the value added in the offshore locations; and (iii) the tax, investment and tariff policies adopted by some developing countries to encourage foreign direct investment. This strategy was perceived by United States firms to have been less costly and risky than investing in the new process and product

147 *International competitiveness in electronics*, Office for Technology Assessment (OTA), Washington, D.C., 1981, pp. 120-121.

innovation, particularly since the industry in question was seen to be maturing.

Whereas United States and most European TV firms have had short time horizons for investment write-off, Japanese manufacturers have taken a longer-term view of profit objectives and investment pay-back. This has been reflected in the emphasis placed by Japanese firms on technological improvement. R and D expenditures in the industry in Japan averaged 4.25 per cent of annual sales of Japanese TV firms, compared with 2.6 per cent for United States firms, during the period 1975-1982. This was accompanied by an active internationalization strategy that increased the presence of Japanese firms in export markets.

In 1981, about 56 per cent of total Japanese production of monochrome TV sets and 34 per cent of colour TV sets was taking place in overseas markets. What may have contributed to this internationalization strategy are protectionist measures in some developed and developing countries, particularly where the domestic market is large, and suitability of the offshore location as an export base to third countries and territories (e.g. Singapore, Republic of Korea, Hong Kong, Taiwan Province of China, Malaysia, Thailand and the Philippines). In those countries and territories investment incentives and export promotion measures have also been adopted.

During the 1970s, two other factors have incited Japanese firms to relocate their production overseas. There was first the revaluation of the yen against the dollar, which made it more profitable for Japan to export from third countries, located mainly in developing Asia. The other factor was the trade policy of the United States, which represents the major export market for Japanese firms. The orderly marketing agreement between the United States and Japan which limited Japanese TV exports to the United States in 1977 resulted in a drop of 25 per cent of United States imports from that country, but spurred a dramatic rise in exports from Taiwan Province of China and the Republic of Korea to the United States. Part of this increase has been met by Japanese production in these two locations.

In Europe, the diffusion of the process technology of automatic insertion and testing was slow. The main reason for that is that the strategy of European firms centred mainly on cost-reducing innovation and less on quality improvements; and it was not evident at the time (early 1970s) when process technology was first introduced in the industry that it would lead to direct cost advantages compared to manual insertion. It was only in the second half of the 1970s, when the quality improvements in Japanese sets produced using this technology had become significant and the cost-reduction features confirmed, that European firms adopted this technology.

The diffusion of this technology has led to a much higher speed and lower cost of insertion per electronic component, a greater number of components automatically inserted and tested (which in the case of Japan reached more than 90 per cent of the components), an improved precision and speed in insertion and consequently less insertion faults per set. Together with automated handling of components and parts and the use of CAD systems for the design of the chassis, it has made the TV receiver industry more dependent on the semiconductor industry.

These developments have entailed changes in the cost structure, organization and flexibility of production. Whereas in the United States the proportion of labour cost was about 17 per cent in 1970, it averaged 8.6 per cent in 1980, declining to 7.4 per cent in 1983.[148] Similarly in Japan, where the level of automation in the industry is higher, labour costs in the late 1970s accounted for less than 5 per cent of total unit production cost, compared to 6.8 per cent for the United Kingdom and 10 per cent for the Federal Republic of Germany. In terms of man-hours per set, labour use was only 1.9 for Japan, 3.9 for the Federal Republic of Germany, about 6 for the United Kingdom and 5 for the Republic of Korea.[149]

The technological changes mentioned earlier have also helped to introduce flexibility in manufacturing by making short multi-model production runs of TV sets economically feasible in a single large plant, which in turn has allowed for quicker adjustment to changing demands in different markets and a better matching of production to sales prospects, resulting in savings on inventory costs.

As a result of these effects, cutting costs by shifting production to locations where

148 United States International Trade Commission, *Colour Television Receivers from the Republic of Korea and Taiwan*, USITC publication 1514, April 1984, p. A105.

149 E. Sciberras, "Technical innovation and international competitiveness in the television industry", *OMEGA*, vol. 10, No. 6, 1982, p. 592, and V. Cable and J. Clarke, *British Electronics and Competition with Newly Industrializing Countries*, (London: Overseas Development Institute, 1981), p. 80.

labour costs are lower - many other things being equal - has become less attractive to developed country firms. Though there is as yet no conclusive evidence that this is generally the case, there are a few examples which show that some developed country firms have relocated part of their production back to the North. This is the case for eight Japanese firms that invested in the United States, some of which had also set up plants in Europe, particularly in the United Kingdom and Italy.

The location decision, however, is more the result of the complex interaction between different factors - including technological change, labour cost, exchange-rate fluctuations, trade policies, and political and economic stability - than it is of technological change alone. This can be further illustrated by the behaviour of firms of the Republic of Korea and Taiwan Province of China. The orderly marketing agreement that was concluded between the United States and these two developing countries/territories in the early 1980s has made firms from these countries invest in TV production facilities in the United States to take advantage of this lucrative market, while at the same time avoiding the trade restrictions. This, however, could not have taken place if firms from the two developing countries did not possess a fairly well-developed technological capability that enabled them, as shown in the earlier trade statistics, to increase their share of the export market, particularly in the United States, in which they ventured to establish production units adapted to high-wage locations.

In effect, firms from these and a few other developing countries, such as Singapore, Mexico, and Brazil, have, through foreign direct investment and, to a lesser extent, licensing agreements, acquired the TV technology from the developed countries. In the Republic of Korea and Taiwan Province of China, for example, more than 90 per cent of electronic components used in a TV set are now produced locally, mainly by indigenous firms. Their strategy has generally been to target the low end of the market, moving from small and simple monochrome sets to large ones, with a similar strategy in their subsequent entry into colour TV production.

Case 3: The automobile industry

A. Introduction

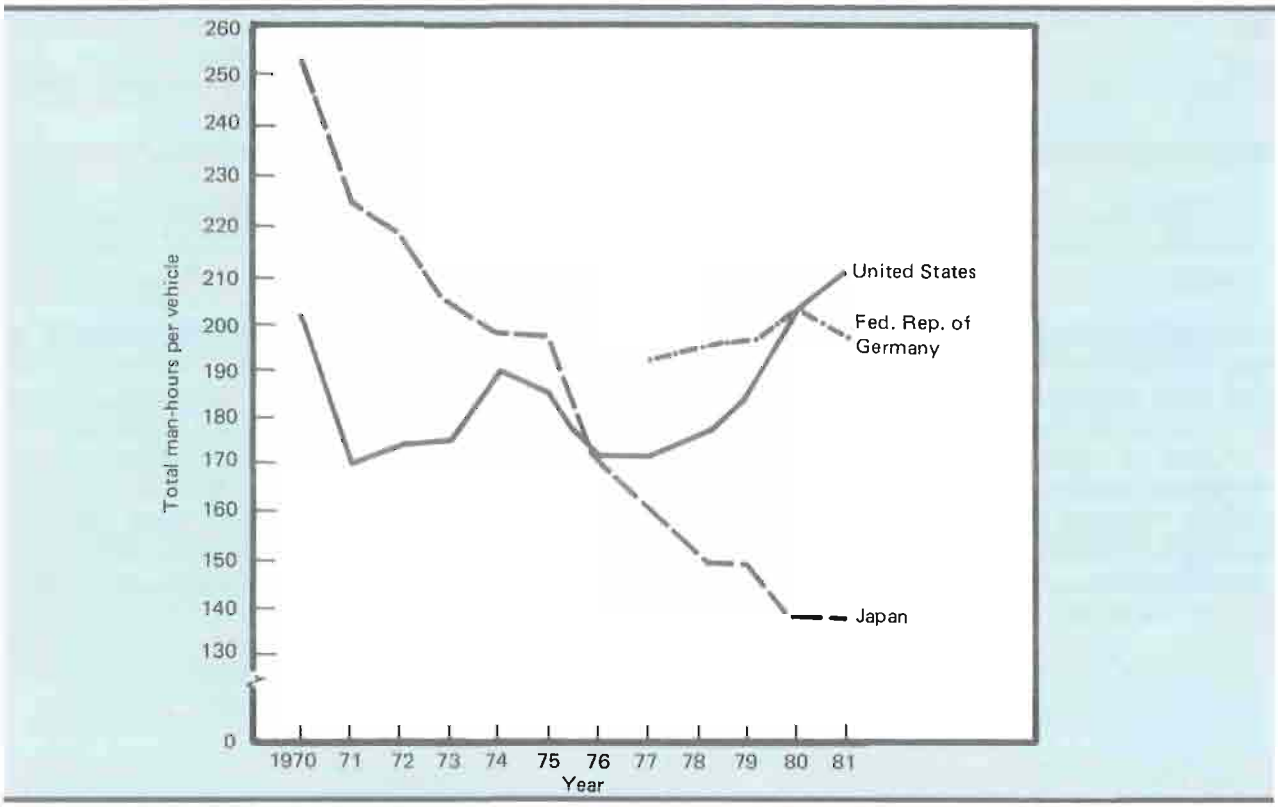
For the first time in its 100-year history, the automobile industry in all the main production locations has become fully integrated. By 1985, over 40 per cent of its output was traded internationally, and events in one part of the world are now directly linked with what happens elsewhere. Three major developments are at present shaping the structure and location of the industry. The first is a breakthrough in the techniques for organizing the complex sequence of design, production and component manufacturing activities pioneered by the Japanese during the 1970s. The second is the rapid take-up of new electronics and materials technologies by the automobile industry in the 1980s. The third is a series of formal or informal measures to restrict the principal trade flows in this industry, which are creating important distortions in the international patterns of investment and trade. This case study reviews these three developments and their consequences.

B. The Japanese challenge

The most fundamental shock to the established automobile industry in the late 1970s was not new technology, but a new level of production efficiency and quality achieved by the Japanese motor industry. Spurred on by an intensely competitive domestic market and by repeated external shocks, Japanese producers successfully adapted and transformed American management techniques to their own cultural and economic circumstances. In the process, they rethought the fundamentals of manufacturing organization and turned many conventional ideas upside down. This led to a new pattern of product development, to new forms of production organization within the plant and to a new set of relationships with component suppliers.

Chart A-I

MAN-HOURS REQUIRED TO BUILD A CAR IN THE FEDERAL REPUBLIC OF GERMANY, JAPAN AND THE UNITED STATES



Source: A. Altshuler et al., *The future of the Automobile* (London: Allen and Unwin, 1984), p.160.

The system has been well documented elsewhere, but can be summarized as follows. A more efficient product development process has reduced the lead time for developing a new model from 5 years to 3.5 years. Models are replaced after only 4 years in Japan, instead of twice that time elsewhere. Whereas in the West, the aim of mass production is to achieve the longest possible run of a standardized part, the Japanese system is geared to producing very short runs "just in time" as they are required. Tooling can be changed very rapidly and inventories reduced, resulting in rapid incremental improvements, flexibility and a truly continuous flow throughout the plant. The successful operation of this system also depends on the elimination of all defects at the point of manufacture and the return of responsibility for quality, routine maintenance and process improvements to the line worker. The operations of a multi-tiered structure of component suppliers are closely integrated with the final assembler. The interdependence of each link in the supply chain, built up over many years, serves to devolve the organization of the system while at the same time mobilizing all the resources of each firm to improve the total system performance. This contrasts with either in-house vertical integration of component supply or arm's length dealing with multiple suppliers common in the West.

The end result of this system, with its emphasis on the co-ordination of the factors of production, resulted in a much better utilization of capital equipment and fewer labour hours required to produce a car of much higher quality. Chart A-I shows the reduction in effort achieved by Japan, which by 1981 translated into a $2,500 landed-cost advantage in the United States and just under $1,000 in Europe. This competitive advantage resulted in a rapid expansion of the Japanese industry and a flood of exports (table A2). Even after the industry came to understand fully what lay behind this competitive advantage, it was clear that a complete overhaul of the Western automobile production system would take many years to accomplish. By 1981 all the main Western countries had erected some form of restriction on the volume of Japanese car imports.

Table A2

WORLD AUTOMOBILE PRODUCTION AND EXPORTS

Country or region	*1960*	*1970*	*1980*	*1985*
			A. Production	
North America	7.0	7.5	7.2	9.3
Western Europe	5.1	10.4	10.4	10.7
Japan	0.2	3.2	7.0	7.6
Other OECD [a]	0.3	0.4	0.5	0.7
Socialist countries	0.3	0.7	2.1	2.1
Developing countries [b c]	0.1	0.6	1.3	1.2
Total	13.0	22.8	28.6	31.5
			B. Trade/exports	
Intra-North American	..	0.9	1.1	1.8
Intra-Western European	1.0	2.7	3.7	4.6
From Western Europe to other OECD [a]	0.8	1.2	1.0	0.9
From Japan to other OECD [a]	..	0.5	3.4	3.8
From Western Europe to developing countries [c]	0.4	0.6	0.3	0.4
From Japan to developing countries [c]	..	0.2	0.5	0.6
Total [d]	2.3	6.4	10.9	12.9

Source: D. T. Jones and J. Womack, 'Developing Countries and the Future of the Automobile Industry', *World Development*, Vol. 13, No. 3, 1985 and national trade sources.

a Australia, Turkey and Yugoslavia.

b Only production with over 80 per cent local content.

c Excluding Turkey and Yugoslavia.

d Including negligible exports from North America, trade among socialist countries and trade among developing countries.

Japanese producers responded to pressure by moving offshore and building 12 assembly and engine plants in North America with a capacity of 2.3 million units, with more to come in Western Europe and elsewhere. The initial successful operation of these Japanese plants in the United States demonstrated that it is quite possible to transfer Japanese management practices outside a Japanese cultural environment. These plants have set a new baseline of best-practice productivity (using about 2/3 of the labour required in a traditional plant) and quality (with half the delivered defects) that all the other plants in the West will have no option but to meet if they are to survive into the next decade. As Japanese producers build up their supplier base abroad and increase the local content of their cars built outside Japan, they will have a global production base less vulnerable to major exchange-rate changes. As with the previous oil shocks, the recent rise in the yen is leading the Japanese to redouble their efforts to improve their productivity, possibly through the use of new flexible assembly automation. Despite this, and the sourcing of some components from South-East Asia, some manufacturers in Japan are now beginning to face pressures to reduce their capacity and employment in Japan.

C. *Electronics and materials technologies*

During the 1980s, a whole range of electronics technologies began to spread through the automobile industry, changing both the product and the production equipment required to make it. The initial impact was in the automation of machining operations and the introduction of robotics into stamping, welding and painting. In the second half of this decade, more sophisticated equipment is also being introduced to tackle the more difficult subassembly and assembly tasks. Apart from eliminating heavy, boring and dirty jobs in these areas, they have been able to increase the consistency and accuracy of the operations, leading to improvements in the quality of the final product.

Before the introduction of flexible manufacturing systems and robotics, the trend was towards ever more automation, geared to high volume output of a standardized part. These new technologies introduced a new dimension of flexibility, enabling for instance the making of different parts and welding of different bodies on the same equipment. The ability to reprogramme robotic equipment for the introduction of new models or variants reduces the tooling costs and enables them to be spread over a larger volume. Such tooling can also be updated piecemeal as new generations of equipment become available, instead of waiting for the introduction of a new model. This flexibility and the potential for incremental, less disruptive improvements have begun to reduce the economies of scale at the plant level in this industry. Economies of scale per model are lower and a full range of cars can now be produced in one or two plants at a much lower volume at a competitive cost, with larger producers using single-model-dedicated plants.

In addition to changes in production equipment, design functions are being transformed by the move towards computer-aided design and the electronic integration of design with production. The design process is becoming more modularized, with key suppliers playing a major part, and the product is designed right from the start for automated manufacture. This is leading to a new synergy between product and process technologies, and the vehicle assemblers' key role becomes to integrate all the systems of the vehicle and to integrate all the production steps. As a result, in the future there may be major redesigns of whole systems in the vehicle and, with the introduction of new materials such as plastics, composites and ceramics, the substitution of new production processes for old.

So far the introduction of these new technologies has not had a major impact on employment, having been overshadowed by the productivity advances made by Japanese producers, using less labour and utilizing and coordinating both labour and capital more effectively. Although new production technology has reduced direct labour in stamping, welding, painting and machining, it has so far hardly reduced the indirect labour required to run this more sophisticated equipment. It will not be until more experience is gained with this equipment and until labour-intensive functions such as assembly are automated that the impact of technology on jobs will be significant. Some manufacturers in the West have sought to catch up with Japan by moving directly to highly automated plants. The results have often been disappointing. It is now apparent that integrating all this high technology equipment will take some time and that the full benefits from this technology will only be achieved if the prior reorganization and integration of the production process along Japanese lines has been undertaken.

D. *Global overcapacity and protectionism*

Although this industry is going through profound changes in its production organization and technology, accompanied by major locational shifts in comparative advantage, it is confronted by a modest growth of demand in the main OECD markets. As a result, the industry is heading for a period of global overcapacity. The resolution of competitive imbalances and the location of this overcapacity is being strongly influenced by trade and investment policies in many countries.

The overcapacity situation began in Western Europe as the result of a major wave of plant retooling by large manufacturers at the end of the 1970s, based on over-optimistic forecasts of demand and ambitions to reach a minimum scale of production of 2 million cars a year - a figure thought critical for a firms' survival in the "world car" era. The market in Western Europe collapsed after 1980 just as this planned capacity by the large producers came on stream. This resulted in a period of intense competition among the European manufacturers, while the Japanese share was constrained by limits on exports to most European

markets. As a result, those national industries which had fallen behind had to embark on ambitious programmes to cut capacity, improve productivity and introduce new models. Although this led to some companies, such as Fiat, making impressive recoveries, some 100,000 and 130,000 people were forced to leave the industry after 1979 in the United Kingdom and Italy, respectively, with more lay-offs to come in France. The European overcapacity was not resolved through major mergers or bankruptcies, although among the smaller manufacturers Seat was taken over by Volkswagen, Alfa Romeo by Fiat and Austin Rover formed closer links with Honda. The situation was ultimately resolved and the European industry returned to profitability when the major producers collectively shed a total capacity of 2 million units.

The introduction of the voluntary export restraint agreement in 1981 limiting Japanese car imports into the United States marked a recognition that the restructuring of the United States industry would take many years to accomplish. Ford and Chrysler, the latter having been rescued from bankruptcy by United States Government guarantees, began to restructure their operations, although in General Motors, accounting for over half of United States automobile capacity, progress has been much slower. As prices rose and the demand for large cars returned, the United States market became very profitable for all concerned. Their first thrust having been blunted, Japanese producers responded by building their own plants in the United States and by moving up-market into the larger-car sectors, dominated by the United States producers. The United States manufacturers in turn sought their own low-cost production sites and are selling or planning to sell cars made in Japan, Republic of Korea, Taiwan Province of China, Thailand, Mexico and Brazil under their brand names throughout the North American market. The move up-market by Japan also left a "window of opportunity" in the smaller-car sectors, which encouraged independent manufacturers in the Republic of Korea and Yugoslavia to enter the United States market also, with considerable success. Finally, the success of the European specialist car manufacturers in dominating the luxury car market in the United States has also led them to expand capacity targeted at the United States market.

As a result of all these developments, capacity is being installed around the world, including in North America itself, which will exceed total demand in North America by at least 4 million units in 1990. The United States was already running a record trade deficit in motor vehicles of $55 billion in 1986, some $29 billion with Japan, and the motor vehicle deficit is one third of the total deficit of $170 billion. Although the limit on Japanese built-up imports remains in place, protectionist pressures are growing for more comprehensive restrictions against other countries also. It seems likely that progress by the United States producers in turning round existing older plants will not be fast enough, even with more protection, to prevent the displacement of some of their capacity by the new Japanese greenfield plants now opening up in the United States. Therefore the United States will experience a growing overcapacity situation as domestic manufacturers have to compete head-on with Japanese manufacturers set to increase further their share of the United States market. A new round of protectionism in the United States would also have significant consequences elsewhere. It could shift some of the burden of overcapacity to Japan and to South-East Asia, in particular the Republic of Korea, where capacity is set to increase by over a million units between 1986 and 1990, in large part intended for export to the United States market.

The dramatic rise in the yen and/or further protectionism against Japanese exports has opened up the possibility of overcapacity in Japan. After years of steady progress some Japanese manufacturers have incurred record losses and have begun to pull back inhouse subcontract work and send surplus workers into their distribution networks in Japan. Component imports from South-East Asia have also begun to increase. As the rest of the world catches up, it may not be possible for Japan to sustain its current level of built-up exports.

Even without running into trade barriers in the United States market, the South-East Asian producers will face a tough competitive battle to maintain their competitiveness in export markets. They are still critically dependent on increasingly expensive components imported from Japan and it will take time to introduce automated equipment and to build an efficient components base producing high-quality parts. The success of ambitious plans to more than double capacity over the next four years may ultimately depend on the growth of domestic demand in these countries.

Case 4: The iron and steel industry

The main end-uses of steel include vehicle manufacture, construction, mechanical engineering, consumer durables and packaging. During the 1980s, the real price of steel has fallen as a result of world excess capacity, acute competitive pressures, and improvements in process technology. At the same time, the performance of steel products has improved. Thinner, high-strength, corrosion-resistant steels are coming into use for motorcar bodies; easily formable, thin steels are now used for canning; while high-strength light sections have lowered the cost of steel construction.

Steel industries of the market economies present a contrasting picture. Steel production is declining among the longer-established steel industries of Western Europe, North America and Japan (chart A-II). There is excess steelmaking capacity in these countries and plant operating rates are low. Yet steel production is expanding vigorously in a handful of newly industrializing countries in South-East Asia and Latin America. Taken overall, areas of growth just offset areas of decline. So, on balance, annual steel consumption in the market economies taken together is likely to remain fairly constant at around 450-470 million tons of crude steel over the whole period between 1980 and 1995, according to International Iron and Steel Institute forecasts.

International competition could be seen as a contest between OECD steel companies and those of newly industrializing countries for a market of constant size. However, trends in steel production are strongly influenced by local consumption patterns. Some of the newly industrializing countries - notably Republic of Korea and Taiwan Province of China - are going to be hard-pressed to meet their own rapidly growing domestic needs. In practice, competition will continue to focus on long-established OECD steelmakers, almost all of whom are experiencing falling local steel consumption. United States and Western European steelmakers have only been able to maintain capacity use at their existing low levels during the 1980s by widespread closure of older works. In most cases, capacity reductions in the OECD area have done no more than help these producers hold themselves against the tide of falling domestic demand. In some cases, closures have been enforced by the market mechanism (United States), or by government policy (as in the United Kingdom or Sweden), or by government-sponsored cartels (EEC).

Competitive rivalry in the presence of so much excess capacity is largely based on costs and, to a lesser extent, on product quality. There are large disparities between production costs, considering all steelmakers are selling much the same product. Trade protection, cartelization and subsidies to loss-making producers enable these marked cost differences to persist. The two largest consuming centres, the United States and EEC, are both protected by trade arrangements.[150] The United States Government has negotiated voluntary export restraint agreements with almost all significant steel exporters worldwide, apart from Canada. These agreements control access to their lucrative domestic market. While restricting imports, these bilateral deals effectively guarantee a very high profit margin on the limited quantities of steel that are allowed in. The European Coal and Steel Community is similarly protected in principle by secret quotas and tacit restraint, but low steel prices make Europe an unattractive destination for most exporters. These trade restraint agreements, coupled with internal Community output quotas for individual steelmakers, have all tended to institutionalize and preserve existing trade flows. They act as a substantial barrier discouraging entry by new producers and prevent the most efficient steelmakers exploiting their competitive advantage. Nevertheless, these restrictions have only delayed adjustment. Over time the more competitive producing centres, such as Canada, Republic of Korea and the United Kingdom, are winning out if only because they have profits to invest in upgrading existing plant and adopting new technology.

A. North America

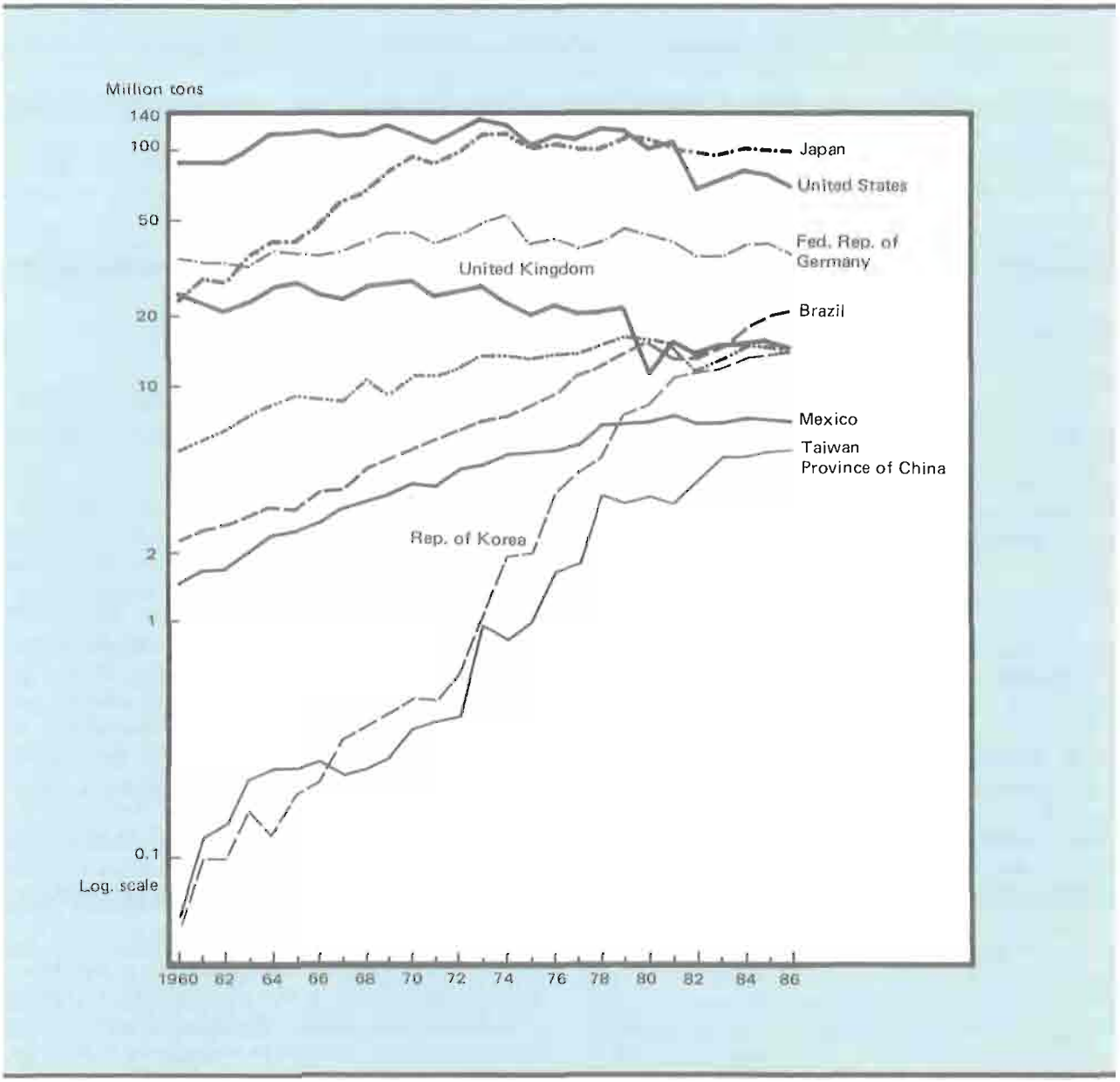
North America offers telling contrasts in steelmaking technology. Firstly, there is a marked difference between the dynamic and innovative mini-mill sector and the declining, technically backward integrated firms within the United States. Secondly, there is a striking

150 See *Costs and Benefits of Protection* (Paris: OECD, 1985), chap. 5: "Steel".

Chart A-II

STEEL OUTPUT IN SELECTED COUNTRIES

(Million tons of crude steel)



Source: Statistics on R and D in the Business Enterprise Sector collected by the Directorate for Science, Technology and Industry (DSTI) of OECD, converted to current US dollars using purchasing power parity (PPP) exchange rates for R and D supplied by DSTI. Reexpressed at constant 1975 dollars using fixed-weight price index for United States R and D costs generated from indices for labour, materials and capital costs for the United States given in IMF, *International Financial Statistics Yearbook*, 1984 (Washington, D.C. 1985).

contrast between these integrated steel firms in the United States and their more progressive Canadian rivals just north of the border in Ontario.

The United States is one of the few places where mini-steelworks are expanding. Mini-mills, or market mills as they are sometimes known, are an alternative small-scale production route for making steel. Mini-mills rely on electric arc furnace melting of a feedstock, such as scrap, in place of the traditional blast furnace ironmaking and oxygen steelmaking complex.

Table A3

CRUDE STEEL PRODUCTION IN THE UNITED STATES

(Million metric tons)

Year	*By minimills*	*By integrated and special steelmakers*	*Total*
1965	3.4	116.0	119.4
1975	7.1	98.7	105.8
1985	16.0	64.1	80.1

Source: D.F. Barnett and R.W. Crandall, *Up From the Ashes: The Rise of the Steel Minimill in the United States*, (Washington, D.C.: The Brookings Institution, 1986), table 1.5.

In the United States, mini-mills now account for a fifth of domestic steel production (table A3). Low cost mini-mill producers have driven back imports of simple rod and bar as foreign steelmakers can no longer compete on price in the United States market. Again, these small, localized producers have supplanted domestic integrated steelmakers in these product areas where mini-mills have the added technical advantage of continuous billet casting and new rolling mills. The long-established companies are hampered by obsolete ingot casting and rolling facilities, as well as by higher materials costs and transport charges to widely dispersed domestic markets. United States mini-mills are now diversifying into flat products, which have traditionally been the preserve of integrated works and jealously guarded by trade protection. A mini-plate mill is working at Tuscaloosa, and a mini-strip mill is under construction at Toledo. Perhaps more significant, Nucor plans an innovative move into strip production using thin-slab continuous casting developed by Schloemann-Siemag in the Federal Republic of Germany. Thin-slab casting obviates some of the marked scale economy advantages associated with large hot-strip mills.

The 60 or so mini-mills in the United States vary considerably in approach, and not all have been commercially successful. But the leading producers are noteworthy for their willingness to buy foreign technology and to try new production techniques (such as eccentric bottom tapping of electric arc furnaces). They have also innovated in the sphere of labour relations. Flexible working practices, multi-skilled craftsmen, no redundancy agreements and less hierarchical, more participatory management has gone hand-in-hand with up-to-date technology at new locations.

In stark contrast, the 14 steel companies which make up the United States integrated sector have failed to modernize plant and adopt well-established new techniques, notably continuous slab casting and secondary steelmaking. As a result, there are almost no world-class, state-of-the-art facilities in the integrated sector.[151] New technologies which have been installed, such as electrogalvanising lines for finishing car-body sheet, suffer from poor feedstock. Despite trade restrictions, there have been substantial imports of high-quality continuously cast slab by United States integrated producers in an attempt to remedy their own technical shortcomings in flat products.

Canadian integrated producers have set out to up-grade their equipment to world best-practice standards in the wake of the Japanese and West Europeans. Dofasco is among the very few major producers worldwide still to be investing significant sums on new plant and equipment. Dofasco chose to modernize an established works at Hamilton through construction of a new hot strip mill, and more recently through adopting continuous casting. Stelco, the largest Canadian steelmaker, built a complete new works during the late 1970s and early 1980s on the northern shore of Lake Erie to supplement its existing works at Hamilton. All Canadian producers suffer from the disadvantage of small-scale equipment which has been costly to build compared with similar plant installed by Western European or South-

[151] See Jonathan Aylen, "Plant size and efficiency in the steel industry: an international comparison", *National Institute Economic Review*, No.100, May 1982, pp. 65-76.

East Asian rivals. Nevertheless, high levels of production efficiency, low energy prices and proximity to the United States market have allowed the two largest firms in the Canadian integrated sector to stay among the most profitable of world steel producers.

In effect, the largest Canadian steel companies have managed themselves into an enviable position where high profits allow them to modernize in order to improve their efficiency and reduce costs, which in turn sustains profits. In direct contrast, their United States integrated rivals failed to invest and innovate for a decade and watched efficiency stagnate and profits decline to a point where they were unable to fund new investment. While Canadian steelmakers have attained an international competitive advantage, United States producers have shown themselves to be at a severe disadvantage.

B. Japan

Japanese steel output grew from less than 10 million tons in 1955 to parity with the United States by 1975, at an output in excess of 100 million tons. Japan is now the largest steel producer among the developed market economies. This rise to prominence was due to four main factors; rapid growth in the Japanese domestic market for steel; adoption of world best-practice steelmaking techniques in large coastal works; low wage costs coupled with high productivity; and entry into a fast-growing world market. Helped by excellent management, good labour relations and big, modern production facilities, Japan remained the world's lowest-cost bulk steel producer until the mid-1980s.

Once the initial phase of expansion was over, steelmakers continued investing heavily in up-grading their existing technology. NKK's Keihin works was replaced by a new works on an offshore site during the 1970s. Nippon Steel Corporation's Yawata-Tobata works was largely rebuilt with new plant by the mid-1980s and a replacement strip mill completed at Hirohata. Other producers took similar, if less expensive, measures to up-grade plant and adopt new techniques such as continuous annealing. Reasoned estimates suggest that by 1985, Japanese steel producers were spending as much on R and D as all United States and EEC producers put together, although not necessarily to such good effect (chart A-III).

The big six integrated steelmakers in Japan are now experiencing a decline in sales similar to that first seen among other established producers a decade earlier. Steel consumption in Japan is beginning to fall as the economy shifts away from heavy, steel-using manufacturing industry and capital investment. Labour costs have risen with living standards and the appreciation of the yen. Japanese steelmakers are no longer the world's lowest-cost producers at a time when there is fierce competition and over-capacity in a stagnant world market.

By the mid-1980s, it became clear to the six leading Japanese steel producers that investment in new techniques and new equipment to cut production costs and enhance product quality was not sufficient to stem falling demand and rising costs. Japanese experience shows that there are limits to which a declining domestic market and fundamental loss of competitiveness can be overcome by a programme of rapid innovation. Investment has now been cut in the face of financial losses. The emphasis in steel has switched to plant closures and heavy redundancies. Companies such as Nippon Steel are belately assessing their future and attempting to diversify. In the meantime, the Japanese domestic market is already seeing a gradual rise in low-cost imports from producers in newly industrializing countries, notably Republic of Korea, Taiwan Province of China and Brazil.

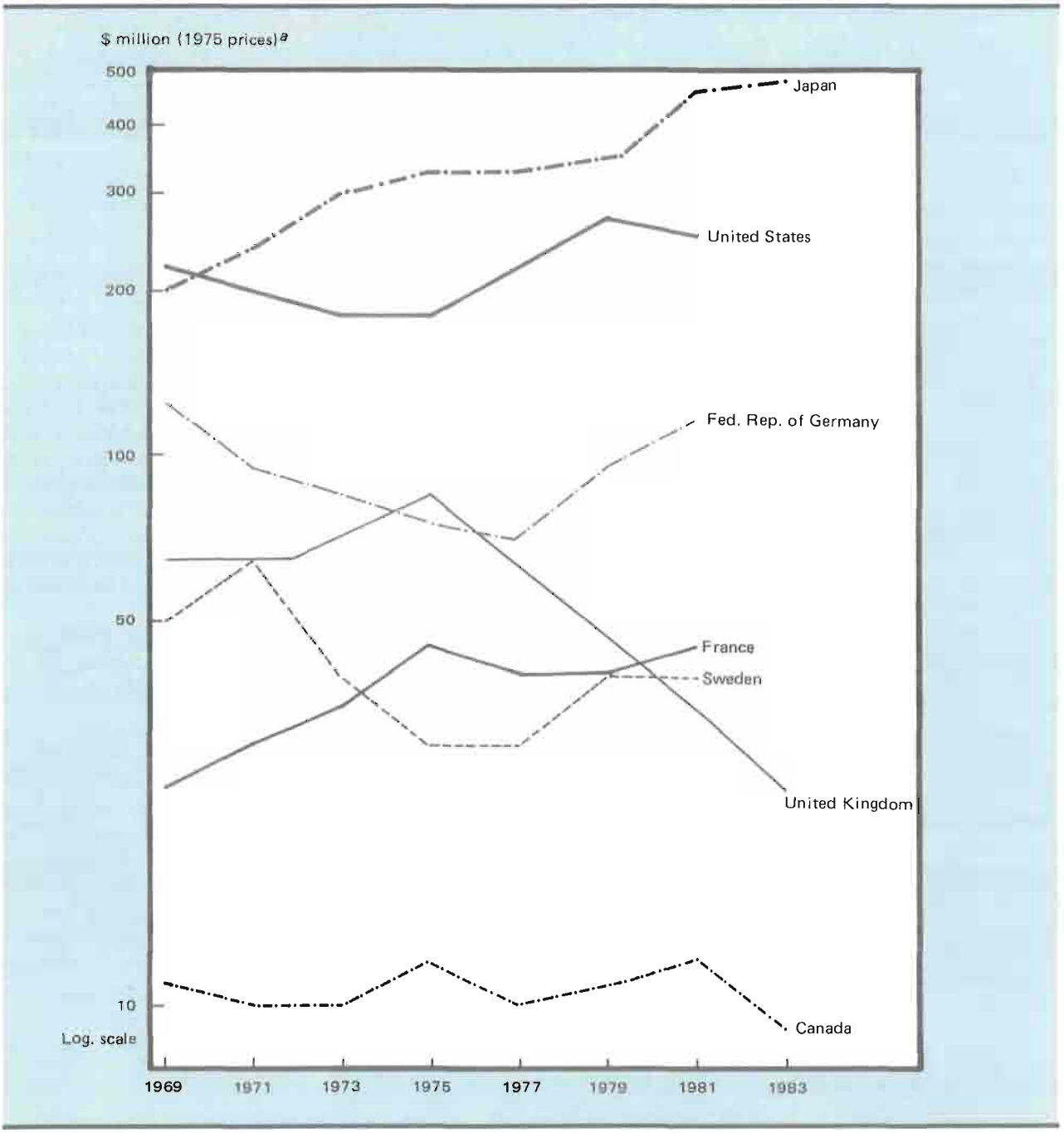
Japanese steelmakers retain technological leadership in a number of areas for the time being. Their most notable advance is close linking of each stage in the sequence of steelmaking, casting, rolling and finishing processes. Japan leads in development of management techniques and equipment for this type of closely integrated steel manufacture, where products flow without delay from one production stage to the next. Close coupling of processes brings substantial savings through lower heat loss, reduced product handling and storage, and lower working capital.

C. Western Europe

The European Economic Community set up a crisis cartel in 1980 in response to surplus capacity. The cartel has fixed minimum prices, allocated output quotas and encouraged capacity reductions. Between 1980 and 1986, capacity has been cut by a fifth, although this overall figure conceals variations in the extent of restructuring within Europe. Since the crisis

Chart A-III

REAL R AND D EXPENDITURE IN THE FERROUS METALS INDUSTRY IN SELECTED DEVELOPED MARKET-ECONOMY COUNTRIES



Source: Jonathan Aylen, "European steel - is there a technology gap?", *Steel Times*, vol. 213, No. 11, November 1985, pp.562-5.

a At purchasing power parity exchange rates.

regime was imposed, employment has halved in the United Kingdom iron and steel sector - perhaps the country where there was most scope for improving efficiency in 1980 - whereas employment fell by less than a third over the same period in France and Italy, and only dropped by a quarter in an already efficient steel industry in the Federal Republic of Germany. In the Netherlands, the workforce was only cut by a tenth between 1980 and 1986, but Hoogovens was already among the world's most efficient integrated flat product firms.

In the United Kingdom, labour productivity rose to European best-practice levels as a result of widespread closure of less efficient plant, drastic demanning at remaining sites, and radical changes in working practices. Measures to save energy and improve the yield of finished steel from raw materials also helped generate profits at the largest steelmaker, the British Steel Corporation, from 1984 onwards. BSC swung from being one of the world's highest-cost steelmakers to one of the world's lowest-cost producers in five years. French and Italian integrated steelmakers were at the other end of this see-saw, swinging into chronic losses as cost reductions failed to match falling European steel prices. Political opposition caused French steel restructuring plans to founder in 1984, while the major Italian State steel firm chose short-time working instead of redundancies.

After falling one or two paces behind, European steelmakers are now matching the Japanese on technology. Strong emphasis among European steelmakers on improved plant performance and higher-quality products, and closure of obsolete facilities, have brought European production standards close to those among Japanese integrated producers. In some areas, such as continuous casting, electric arc furnace operation and blast furnace equipment, Europe has always been strong. In fields such as rolling mill control, European strength in software and instrumentation have put their steelmakers ahead. Renewed technical confidence in Europe is reflected in the success of plant suppliers from the Federal Republic of Germany, United Kingdom and Austria in the Republic of Korea.

D. Republic of Korea and Taiwan Province of China

The Republic of Korea and Taiwan Province of China have two advantages as emergent steel producers: fast growing domestic markets and high production efficiency allied to low labour and capital costs. In many respects, development of State-sponsored POSCO in the Republic of Korea and China Steel in Taiwan Province of China echoes the rise of the big Japanese steelmakers two decades earlier. Rapid industrialization, heavy investment and rising affluence have pushed domestic steel consumption upwards. Continuing growth in home sales enabled large coastal works to be built using modern technology. Recent plant units such as blast furnaces and hot strip mills at POSCO and China Steel are as large as, or larger than, those typically found in Western Europe or North America.

The technical formula of large plants and best-practice technology are not sufficient to explain their success. Both POSCO and China Steel have shown skill at managing adoption of new technology. The two firms purchased equipment in competitive world markets at a time when order books of process plant suppliers were otherwise empty owing to cut-backs in spending on steelplant throughout the world. With few exceptions, they have purchased equipment on grounds of cost and potential performance from Western European and Japan, disregarding trade preferences. Projects have been built swiftly. Blast furnaces have all kept to the 29 or 30 month norm - or better - from start of construction to blow-in. Rapid completion of capital schemes is an area where other developing countries often fall down. Construction expertise enabled firms in the Republic of Korea to complete projects at Pohang and Kwang-yang at lower capital costs than any other location in the world. Helped by training from Western Europe and Japan and a large in-house training programme, new plant has been commissioned quickly and operated at, or beyond, full rated capacity. A ruthless, almost military, attention to productive efficiency, combined with low input costs, make POSCO the world's lowest-cost large integrated producer.

Case 5: The textile and clothing industries

From the earliest beginnings of modern mill production up until the inter-war years, the development of textile, and later clothing, production was predicated upon the growth of a mass market. Technological change in these industries thus tended to focus primarily on the

Table A4

TECHNOLOGICAL CHANGE IN THE TEXTILE AND CLOTHING INDUSTRIES

Nature of technological change	*Effects on:* *Cost structure*	*Productivity*	*Product quality*	*Production flexibility*
		I. SPINNING		
Computerized bale selection, automatic feed	Lowers raw material and labour costs	Increases speeds	Better fibre blending improves yarn quality	
Chute feed to cards		Eliminates picker laps & transport	Eliminates run-out problems, which damage fibres	
High-speed cards		Increases speeds from 4-18 lbs/hr to 100-250 lbs/hr		Requires the use of a blending machine
High production combers (automatic lap feeding & can-changing		Increases speeds from > 100 nips/min to 240 nips/min		
High speed draw frame	Reduces K costs since fewer machines	Increases speeds from 100 ft/min to 1640 ft/min	Stop motions to stop frame when sliver breaks	
Ring spinning	Fewer machines, with higher speeds	Speeds increased from 12000 rpm to 20000 rpm		Increased versatility
Open-end (rotor) spinning	Saves floor space; reduces labour costs by 2/3 compared to ring spinning	Rotors are 3.5 times faster than ring spinning; roving & winding are eliminated		Not usable for fine yarns
		II. WEAVING		
Sulzer-Missile looms (1953) PU model	Compact design, wider loom	Self-lubricating reduces wear and maintenance down-time, speed up to 300 ppm; self-adjusting projective brakes eliminate a manual task, unifil eliminated	Electronic monitoring and diagnostics for stop	High flex. wide loom, electronic pattern changing
Maxbo Air-jet (Sweden: 1950)		500 ppm		Limited to narrow widths
Eltitex Water-jet (Czech: 1955)/Nissan looms		500-800 ppm		Limited to smooth hydrophobic filament yarns

(For source see end of table.)

Table A4 (continued)

TECHNOLOGICAL CHANGE IN THE TEXTILE AND CLOTHING INDUSTRIES

Nature of technological change	*Effects on:* *Cost structure*	*Productivity*	*Product quality*	*Production flexibility*
Draper-rapier loom DS1 model 1957; DLG model	Cheaper than air jet missile looms	300 ppm		More versatile than air or water jets; uses wider ave. quality weft yarns
SACM MAV-DN rapier loom	Reduces floor space with double width machines; lower noise level	300 ppm	Electronic monitoring	More versatile than air or water jet looms
Saurer 400 (Picanol PGW. Dornier etc.	Cuts space requirements	300 ppm	Electronic monitoring	More versatile than air/water jet looms
Preparation, finishing dyeing	Reduces amount of water and hence energy for drying	Increases speed of drying	Electronic quality control	Increased machine & process versatility
Knitting	Lower labour costs than weaving	Faster than looms; eliminates sewing of seams		Computerized pattern change
Non-wovens	Cheaper to produce planar assemblies of fibres held together by mechanical interlocking or thermoplastic techniques	Eliminates spinning and weaving		
		III. CLOTHING		
Pattern grading, fabric spreading marking and cutting	Reduces labour and optimizes material usage	Increased speeds		Computerized, automated
Automatic/ numerically controlled sewing machines	Reduces skill requirements, rationalizes sewing process	Increased speeds	Enhances uniformity of product	Increases flexibility in adjusting to design & pattern changes

Source: Prepared at the request of the UNCTAD secretariat by Ms. Lynn Mytelka, Carleton University, Ottawa, Canada.

lengthening of production runs for standardized products and to a lesser extent on labour reduction strategies associated with increased machine speeds, reduced machine down-time and the elimination of steps in the production process. The latter, along with international sub-contracting, gained particular importance in the 1960s when trade liberalization in the context of GATT and the creation of the European Economic Community coincided with rising exports from low-cost Asian producers, notably Japan, Hong Kong, Republic of Korea, Taiwan Province of China, India and Pakistan.

Though they were far more productive than their predecessors, most of the major innovations of the 1950s and 1960s - open-end spinning, shuttleless looms and circular knitting machines - were, for technical reasons, initially quite limited in their applications (see table A4 for a list of new technologies). In the case of open-end spinning, this meant restriction to coarser counts and in knitting to synthetic fibres. Resort to protection through the short-term cotton Arrangement in 1961 and the long-term Arrangement a year later, coupled with the relatively limited reduction in costs obtainable from modernization at that time and the alternative strategies then available, slowed the diffusion of new spinning and weaving techniques in many of the industrialized countries during the 1960s. By relying on alternative strategies that diminished domestic restructuring efforts, moreover, firms in these countries became more vulnerable to the rising competitive pressures of the 1970s. The French and United States cases described below illustrate this point and provide a stark contrast to the restructuring process pursued by firms in the Federal Republic of Germany, Italy and Japan during the 1960s and 1970s.

A. Restructuring in the advanced industrial countries

In both the United States and the Federal Republic of Germany, where relatively higher wages at an earlier date put additional pressure on the domestic industry, some modernization was undertaken in the 1960s. For the most part, however, profitability could be maintained not only through modernization but also through vertical integration, mergers and take-overs that strengthened the market position of the firm and through the relocation of production to low-wage areas. For the United States, this meant the migration of the textile industry from New England to the southern states and subsequently to Asia and to the Caribbean. Imports of clothing under value added tariffs (item 807.00 of the United States Tariff Schedule), which stood at $1.7 million in 1965 - less than 1 per cent of total clothing imports - rose to over 10 per cent in 1974. While the value of clothing imports under tariff item 807.00 tripled over the following ten years, reaching $788.4 million in 1984, the share of imports under that item in total clothing imports fell to 6.4 per cent in that year as the high value of the dollar and a decade of low productivity growth turned the United States market into a Mecca for textile and clothing exporters.

Although textile and clothing firms of the Federal Republic of Germany also engaged in sub-contracting, mainly to Eastern and Southern Europe, they combined this strategy with a continuous effort to modernize spinning and weaving operations in the home industry. This country's textile and clothing industry was thus able to acquire a competitive advantage within Europe at the same time as its adjustment stimulated the growth of the Federal Republic's textile machinery industry. During the 1970s and 1980s, when links between machinery manufacturers and the textile and clothing industry permitted the development and more rapid diffusion of new machinery and equipment, the existence of a textile machine-building capacity in the Federal Republic proved crucial in the adjustment process. This is evident from the dramatic increases in productivity in the Federal Republic's textile industry since the 1960s. In spinning, for example, the productivity of capital rose from 62.8 kg per spindle in 1960 to 89.3 kg in 1973 and to 122 kg in 1983, and the productivity of labour increased from 6,100 kg per worker in 1960 to 9,035 kg in 1975 and 16,000 kg in 1983. In weaving, the productivity of capital rose from 14,300 m2 of cloth per loom in 1960 to 43,700 m2 in 1982. By the early 1970s, the Federal Republic of Germany had replaced Japan as the world's top textile exporter, a position it maintained until 1985.

The evolution of textile and clothing production in Italy and Japan during the 1970s similarly reflects the successful combination of modernization with subcontracting - in the Italian case to domestic firms and in the Japanese case through direct investment in firms in the Republic of Korea, Taiwan Province of China, Hong Kong and the ASEAN countries. In Japan, modernization was encouraged by specific State policies that addressed the restructuring needs of the textile and clothing industry, going so far as to bring firms from the textile, robotics and electronics

industries together to develop new production techniques. Firms in both countries have thus remained internationally competitive and this has enabled Japan and Italy to maintain their second and third place positions respectively among the world's leading textile exporters during the 1980s and, in the case of Italy, to remain the world's second largest clothing exporter as well.

The reverse was true in France. Encouraged by government policies that subsidized labour costs, favoured concentration and promoted foreign investment, French textile firms in the 1960s and 1970s invested in final-stage cloth production in Africa, thereby permitting a small number of larger firms to maintain profit margins by exporting increasingly less competitive textile products to that continent. These firms also pursued mergers and takeovers at home, but they did so with little accompanying rationalization of production. Increased competition within Europe added to the pressures on profits for non-internationalized firms. The result was a steep decline in new investments in the textile and clothing industry which, as in the United States case, threatened the survival of the textile machinery industry and led to a progressive loss of competitiveness to other EEC partners. Thus the textile and clothing industry, which had accounted for 8.3 per cent of gross fixed capital formation in the early 1960s, accounted for only 3.3 per cent in 1979. French textile and clothing exports, moreover, rose by only 58 per cent in constant dollars between 1967 and 1983, while exports of its main EEC competitors - Federal Republic of Germany and Italy - rose by 152 per cent and 172 per cent respectively during this period. The French Government's two-year textile plan in the mid-1980s boosted investment once again, but alone could not reverse a situation created by two decades of low levels of investment.

The vulnerability of those textile and clothing firms that failed to pursue a continuous process of adjustment in the post-war period was to increase as the very nature of the competitive process itself changed in the 1970s under the effects of the global economic crisis. More than a decade of slow growth and high unemployment in the advanced industrial countries has had two major consequences for the textile and clothing industry. On the demand side, it has radically altered consumption patterns in the clothing industry. This has particular significance because, in the absence of a wide range of new products or of new applications for older products in the textile industry (world consumption of carbon fibres in 1982, for example, totalled a mere 1,200 tons in the 29.8 million tons of synthetic and natural fibres consumed industrially that year), clothing consumption remains the major factor affecting the growth of the textile and clothing industry as a whole. On the supply side the crisis has accelerated the processes of technological innovation and diffusion in the advanced industrialized countries, giving rise to serious consequences for third-world textile and clothing exporters and those aspiring to that status.

B. From mass market to segmented market

As incomes rose in the advanced industrial countries, a secular decline in the rate of growth of consumer spending on clothing became evident. In the 1970s, the economic crisis accelerated this decline and it segmented textile and clothing markets along income and product lines. These changes are reflected in national accounts statistics that show a dramatic decline in consumer spending on clothing and in standardized surveys of household consumption patterns.

In Japan, for example, the annual average percentage rate of change in consumer spending on clothing fell from 6.9 per cent in 1963-1973 to 0.3 per cent in 1973-1982, declining further into a negative rate of growth in the early 1980s. In EEC, the growth of consumer spending on clothing fell from 3.9 per cent in 1963-1973 to 0.9 per cent in 1973-1983, declining to a negative rate of growth of -0.2 per cent during the early 1980s. As in the Japanese case, consumer spending on clothing lagged behind total consumer spending. Only in the United States, the United Kingdom and Sweden, where the relative price of clothing remained well below that of other consumer goods, did the rate of increase in consumer expenditure on clothing in the period 1973-1982 remain above the annual average percentage rate of change in consumer expenditure as a whole.

In addition to price, price-quality relationships resulting from the differential impact of the crisis (intermediated by government policies) on incomes in these countries became important. Thus slower rates of growth in consumer spending on clothing in the advanced industrial countries were accompanied by a segmentation of the market into income categories having different price and income elasticities of demand. Combined with current slower growth in third-world consumption resulting from a high level of indebtedness and

the imposition of austerity measures, world consumption of textile and clothing products has been growing at a slower rate in the 1970s and 1980s than previously and this is expected to continue over the medium term.

The zero-sum nature of international competition in this industry resulting from the slower growth of world textile and clothing consumption, coupled with the market-segmenting effect of the crisis, has called into question earlier growth strategies based exclusively on mass-produced, standardized products at the same time as it has focused attention on the need to maintain market shares. It has also led to a change in the mode of competition itself, from one based primarily on price to one in which competition is waged simultaneously in terms of price and creativity. This, in turn, has stimulated the adoption of both cost-reduction and product-differentiation strategies. What is unique about the present period is that both must be done simultaneously and each requires increased innovation, since only through innovation in products, processes, marketing techniques and organizational forms can new competitive advantages be created.

C. *The growing knowledge-intensity production*

During the 1970s, the pull of textile demand was accompanied by a push from the electronics, computer and some metalworking industries then facing a slow-down in the growth of demand from established markets. Efforts to apply these advanced techniques in new ways began and in the textile and clothing industry are reflected in the development of automated pattern cutting (the American Gerber method finding its inspiration in metal-cutting techniques developed for the aerospace industry, the French Lectra Systems technique drawing upon laser technology), in the incorporation of electronic devices into spinning, weaving and knitting machines and in the computerization of the design and management processes.

Already highly automated, electronic controls in the spinning, weaving and dyeing branches of the industry improved diagnostic and monitoring capabilities and reduced down-time as models, patterns or colours changed or threads broke. This in turn provided major cost savings through reduced labour time and energy consumption, materials savings and improved product quality. In Japan, operating manpower requirements in spinning, for example, were reduced from 76.6 workers per 10,000 spindles in 1975 to 43.5 workers in 1982. In knitting, techniques that were both labour-saving and offered flexibility in model changes and design became available in the 1980s and their appearance revolutionized the knitwear industry as the time needed to change over to a new model fell from 3 hours to 13 minutes. Newer, more productive, weaving techniques were also developed. The airjet loom, whose speed, measured in terms of the weft insertion rate, is 4.5 times faster than traditional looms and half again as fast as earlier shuttleless looms of the projectile and lance type, is an example.

With computer-aided design, collections could be larger and model changes more frequent. The integration of design, pattern grading, marking and cutting, the principal preparatory stages in the clothing industry, has reduced costs and increased flexibility still further. By turning cash registers into terminals that also collect data, sales production is also linked more closely to distribution. The elapsed time from product conception to the point of sale has thus been significantly reduced. By increasing the speed of response to changes in demand, these organizational innovations give a competitive edge to firms that are in close contact with their market. In most instances, this favours firms located in the advanced industrial countries.

As the above illustrates, the textile industry as a whole and the preparatory and marketing stages of the clothing industry have become more knowledge-intensive, in the sense that they involve considerable outlays of time and expense for design, engineering, management and marketing: demand from this industry has stimulated R and D in other manufacturing sectors. In the making-up stage of the clothing industry, which accounts for nearly 90 per cent of the labour costs, major innovations are now closer to commercialization than one would have imagined five years ago. In the United States, TC2, for example, is currently testing programmable robotic sewing machines with prehensile arms that are capable of such complex sewing operations as sleeve and pocket-making. In Japan, the development of 3-dimensional sewing techniques has also advanced.■

Annex 2

RECENT DEVELOPMENTS IN COMMODITY MARKETS

A. Overall performance

With few exceptions, the overall situation of imbalance between supply and demand which has put downward pressure on prices of internationally-traded primary commodities since the beginning of the 1980s, continued to prevail in 1986. There was, however, a recovery in the markets of a very limited number of commodities, which brought about a modest improvement in the overall price index of non-oil primary commodities.

In nominal terms, the UNCTAD index of non-oil primary commodities exported by developing countries increased by 5.5 per cent in 1986 over 1985. As can be seen in Annex table 11, the price recovery was short-lived from the last quarter of 1985 to the first quarter of 1986, and was due essentially to higher prices of coffee and sugar. If the large increase in prices of those two commodities is disregarded, the UNCTAD index shows a decline of about 5 per cent from the 1985 level. For a number of commodities, such as cereals, sugar, vegetable oils, cotton and tin, prices fell to pre-1973 levels during at least part of 1986. A number of studies have been undertaken by the UNCTAD secretariat to determine the origins of the exceptionally low prices of the 1980s, the main findings of which are summarized in the paragraphs which follow.[152] The main developments in the world economy which led to excess supply and sluggish demand were the slowing down of growth in the world economy in the 1980s; the decline in the relative importance of manufactures in total output; reduced materials input per unit of output; technological progress and substitution of synthetics and new materials for traditional natural products. All these factors explain, to a great extent, the considerable slow-down in world demand for primary commodities. On the supply side, there has been a tendency towards overproduction, resulting partly from increases in agricultural productivity, partly from the policies of governmental price support, and partly from the rigidity of supply in adjusting to changing market conditions. A further factor influencing expansion of supply has been the debt-servicing difficulties in many of the heavily indebted developing countries.

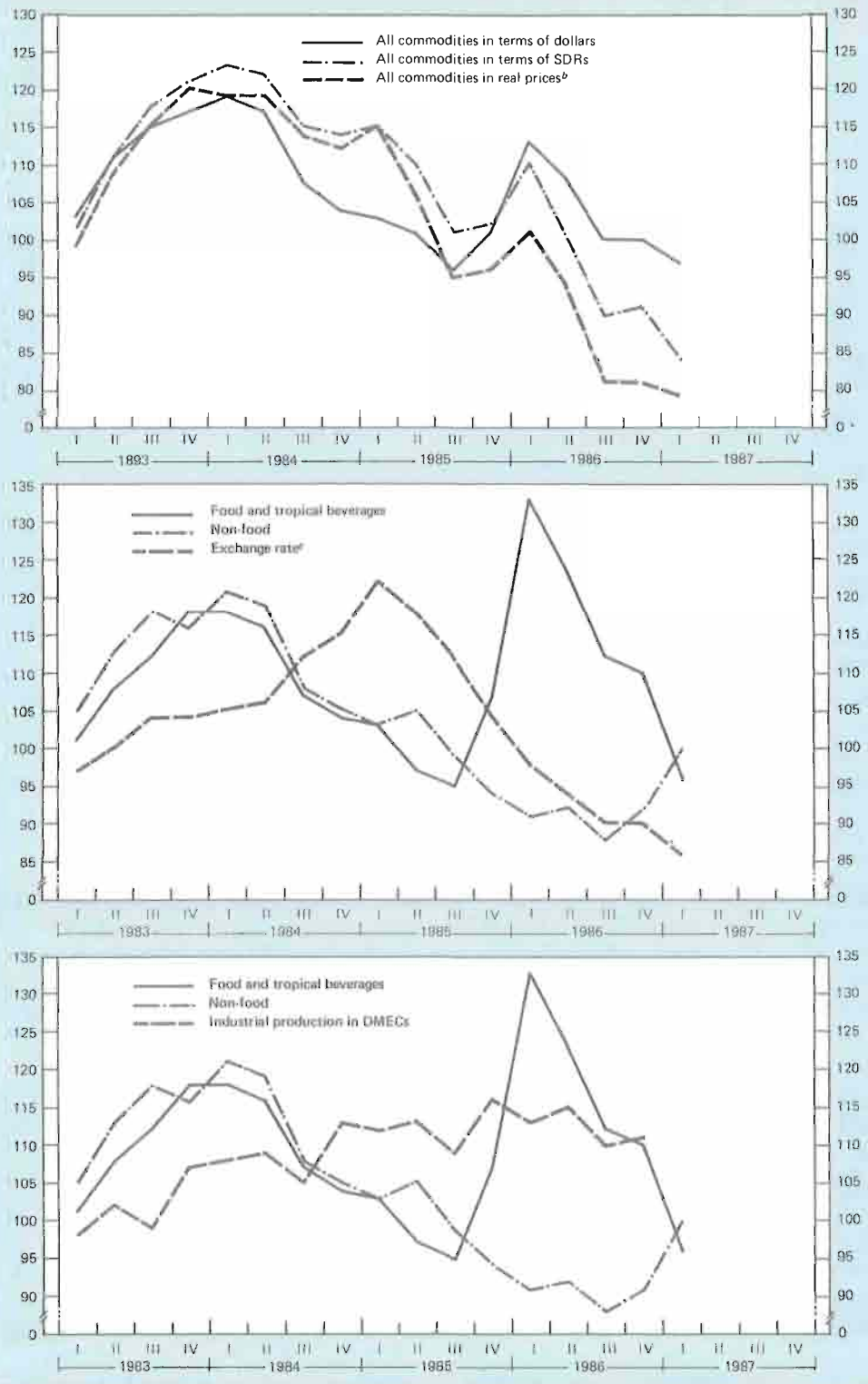
Apart from all these factors which influence the markets in the long run, there were cyclical factors at work, mainly from the demand side. Their impact, however, has not been uniform over time or for commodity groups; nor has it followed the usual pattern. Industrial production was on a rising trend from the first quarter of 1983 until mid-1985. Prices of raw materials recovered during the first half of that period, but thereafter there was a deep and prolonged recession (see chart A-IV). Food prices followed a somewhat simi-

[152] For the detailed findings see: *Trade and Development Report 1985*, and *ibid 1986*; "Commodity Survey 1986" (TD B C.1 284 and Corr.1); *Revitalizing Development, Growth and International Trade: Assessment and Policy Options* (TD/328 Rev.1), chap. III.

Chart A-IV

QUARTERLY INDICES OF FREE MARKET PRICES OF PRIMARY COMMODITIES [a] EXPORTED BY DEVELOPING COUNTRIES

(Fourth quarter 1982 = 100)



Source: See Annex table 11.

a Excluding fuels.

b Index in dollars prices deflated by the United Nations index of unit values of manufactures exported by developed market-economy countries.

c Effective dollar exchange rate.

lar pattern. However, it should be stressed that the price increase which took place in 1983 has been mainly supply-induced. Poor crops in the case of cocoa and coarse grain and export restrictions in the case of coffee and tea contributed to the decrease in available export supply in 1983. Similarly, in 1986, the sharp increase in food prices reflected increases in the prices of coffee and sugar which were boosted by supply factors (see below).

Commodity prices expressed in dollar terms did not react as expected to the depreciation of the dollar. Indeed, as just noted, the increase in food prices which took place around the beginning of 1986 while the effective exchange rate of the dollar was falling has to be related to factors on the supply side. Furthermore, during the rest of 1986 and the early months of 1987, food prices fell, while the dollar continued to depreciate. As regards raw materials, the impact of the depreciation of the dollar has only been felt since the third quarter of 1986 (see chart A-IV).[153]

The behaviour of the dollar index of non-food prices in the course of the last cycle seems to indicate that there exists an important asymmetry in the pass-through mechanism, namely that a depreciation of the dollar does not strengthen commodity prices to the same extent that an appreciation weakens them.

The depreciation of the dollar has apparently had a strong influence on the dollar prices of manufactures (see Annex table 11). The United Nations index of unit values of manufactured goods exported by developed market-economy countries has been rising since the second quarter of 1985 in line with movements in the effective exchange rate of the dollar, and in 1986 it was 20 per cent higher than in 1985. There has thus been a further deterioration in the terms of trade for primary commodities.

B. Outlook

With a deceleration in world economic activity expected in 1987, the demand for primary commodities is likely to slow down concurrently. On the demand side, low prices, coinciding with the weakening of the dollar against other major currencies, are likely to give a moderate boost to demand. On the supply side, certain measures taken at the national or international level to restrict supply may also have some impact on prices. In the fourth quarter of 1986, there were already some signs of recovery in the markets for vegetable oils and oilseeds and agricultural raw materials stemming from both demand and supply, as well as from the fall in the dollar exchange rate. All in all, the price outlook is for a further moderate increase in commodity prices in nominal terms. However, the rise is not expected to match that of prices of manufactures exported by developed countries, and consequently there is likely to be a continued deterioration of the terms of trade of primary commodities.

153 Estimates of the elasticity of the dollar prices of non-oil primary commodities with respect to the effective exchange rate of the dollar range from -0.5 to -0.75, which means that, *ceteris paribus*, a 10 per cent appreciation of the dollar can be expected to lower commodity prices by between 5 per cent and 7.5 per cent. (See the study by the UNCTAD secretariat, "The exchange-rate system" (UNCTAD ST/MFD/3.) With respect to the lag in the transmission of the exchange-rate effect to commodity prices, one study found no evidence of such a lag while another suggested that it varied from a minimum of nine months to a maximum of two years.

C. Developments in major commodity markets

1. *Cereals*

Prices of cereals fell in 1986 for the fifth year in succession. Over the period 1981-1986, the price of wheat dropped by 35 per cent, of maize by 33 per cent and of rice by 57 per cent. In real terms, world prices of cereals in 1986 reached their lowest level since the Great Depression of the 1930s.

According to FAO estimates, production of cereals increased slightly in 1986 over the previous year. Significant was the rise of around 2 per cent in the output of developing countries, whereas there was a slight decline in the developed countries. This contributed to a further decline in world trade in cereals and to an increase in stocks held by the main exporters. The volume of imports of cereals declined by 4.6 per cent in 1986, following a 17 per cent drop in 1985. This sluggish development also reflected import constraints in a number of developing countries on account of balance-of-payments difficulties. There is little hope that prices of cereals will recover in 1987. It is too early to evaluate the harvest prospects for 1987/88. Nevertheless, with the 1986/87 end-of-season stocks recently estimated as representing more than one-quarter of projected consumption, prices of cereals are expected to remain low in 1987.

2. *Sugar*

Developments in the sugar market in 1986 again proved that the free world market price is particularly vulnerable to speculative activity. A mere 2 per cent decline in sugar output in the 1985/86 season, which marginally reduced the huge carryover stock at the end of the season, brought about a sharp recovery in price. The free world market price trebled from June 1985 to April 1986, rising from 2.8 c/lb to 8.3 c/lb. The subsequent decline from April to October 1986 reflected an awareness that sugar was still in worldwide surplus. However, news of the tight supply position in Brazil as a result of drought once again boosted the price of sugar, in November 1986, and world sugar prices continued to strengthen in the first quarter of 1987 despite the announcement in December 1986 of a significant cutback in the United States sugar import quotas for 1987. Prospects are for a balance between production and consumption of sugar in 1987. Thus, while prices may fluctuate in response to unexpected market developments, the overall situation is not likely to improve.

3. *Coffee*

The impact of the 1985 drought in Brazil, which led to an increase in 1986 of about 27.5 per cent in coffee prices over the 1985 level, appears largely to have been absorbed by the end of 1986. In December of that year prices were lower than the average for 1985. In order to halt the slide in coffee prices, the question of the reimposition of export quotas was discussed at a meeting of the International Coffee Council in February/March 1987, but producers and consumers were unable to agree on a distribution formula (see Box A1) . Since it now appears unlikely that quotas will be reintroduced during the current crop year (1986/87), and in view of the huge carryover stocks and good prospects for the 1987/88 crop, the price of coffee is likely to continue to fall.

4. *Cocoa*

The price of cocoa dropped by about 6 per cent in 1985 and by a further 8 per cent in 1986, the main reason being excessive stocks in the exporting countries. Price fluctuations from month to month suggest that prices tend to be sensitive to news about the renegotiation of the International Cocoa Agreement. In the first half of 1986, the difficulties over the renewal of the agreement were reflected in the constant weakening of cocoa prices. With the successful negotiation of a new agreement in mid-July, the market sprang into life, but had weakened already by November/December, when the necessary number of ratifications had still not been reached. In January 1987, the announcement that the agreement was to be brought into focus boosted prices yet again. Owing to the amount of buffer-stock buying

which is permitted under the agreement, the price of cocoa is likely to increase somewhat in the short term.

5. *Vegetable oils and oilseeds*

In real terms, the prices of vegetable oils and oilseeds were historically low in 1986; in nominal terms they were on average less than half the level of 1984. Prices of coconut and palm kernel oil fell the most, since supplies were ample on account of good crops over three consecutive years. In response to the low prices, the consumption of fats and oils grew at an above-average rate of 5 per cent in 1986, but this proved insufficient to prevent stocks from increasing. New crops in 1987 are expected to meet the estimated consumption requirements for that year. Consequently, a further accumulation of stocks is unlikely and the downward pressure on oil prices may have come to an end. Some strengthening in vegetable oil prices since October 1986 is likely to reveal a more balanced outlook for supply and demand, and thus give some hope for price improvement.

6. *Jute and jute products*

Prices of jute and jute products returned to low levels in 1986 as bumper crops were harvested in all major producing countries, following increases in plantings in response to the exceptionally high prices that prevailed in 1984/85, when bad weather reduced supplies. The low prices in early 1986 have brought about reduced plantings and consequently production in India and Bangladesh is down by more than 40 per cent in the current 1986/87 season. Supplies, however, are expected to remain ample because of the large carryover stock. As regards consumption, market losses in the period of high prices and short supplies in 1985 were only partially recouped in 1986, when prices returned to low levels. However, in view of the reduced imbalance between supply and demand and of exchange-rate movements, a firming up of the dollar prices of jute and jute products is expected for 1987.

7. *Cotton*

A significant increase in the world production of cotton over the 1984/85 season transformed the world cotton market situation into one of scarcity and rising prices from one of surplus and falling prices. The huge surplus of cotton at the end of the 1985/86 season depressed prices in 1986, with the result that in July of that year the price of cotton was about one-third lower than a year earlier and lower even than 15 years earlier. Towards the end of 1986, prices responded to a reduction in incentives for cotton growing in China and the United States, and this modest recovery is likely to last for a while, as production estimates have been reduced and consumption is growing steadily. However, stock levels remain excessively high.

8. *Natural rubber*

Despite a slight excess of production over consumption in 1986, the average price of natural rubber, as measured by the INRO daily market indicator price, was about 8 per cent higher than in 1985. This increase was, however, the result of depreciation of the Malaysian/Singapore currency in which the market indicator price is expressed, and in SDR terms the price fell by almost 9 per cent. Nevertheless, the low levels of commercial stocks and steady demand helped to keep prices relatively firm. There were thus no further purchases for the buffer stock under the International Natural Rubber Agreement, which remained at the level of 360,000 tons reached in 1985. A new agreement was negotiated in March 1987 to replace the current agreement, which will expire on 22 October 1987.

9. *Tropical timber*

Prices of tropical timber in 1986 increased by about 13 per cent over their 1985 level, and rose further in the first quarter of 1987, on account of both demand and supply factors. In Japan, the largest importer of tropical timber, there was a boom in house construction in contrast to the depression in the export-related industries in 1986. Appreciation of the yen against the dollar may also make a positive

contribution to increasing demand. On the supply side, during the past decade the major timber-producing countries of South-East Asia have taken action to restrict timber exports. Thus, tropical timber is perhaps one of the few primary commodities which may face some supply constraints over the medium term.

10. Fertilizers

Prices of fertilizers are strongly influenced by world grain production. With the prolonged oversupply in the markets of cereals and declining prices, fertilizer prices fell significantly in the past years. More particularly affected was the price of potassium chloride, which fell about 12 per cent in 1986. Prices of phosphate rock performed rather better, having been stable over the last three years. However, prospects for 1987 are gloomy; modest import demand was reflected in the limited progress made in contract negotiations for 1987 during January-February. In this situation exporters have been reluctant to push for higher prices. Higher purchases by developing countries were reported recently in the markets for certain other fertilizers, but they are hardly likely to be large enough to offset the negative impact of agricultural policies in developed countries on the demand of fertilizers.

11. Metals

The prices of metals have been weakening since 1980, declining at an average annual rate of about 7 per cent, mainly because of the impact of a long-lasting slow-down in world consumption of metals. This contraction in the growth rate of world metal consumption affected all major metals, except for aluminium. Substitution of new products, new technologies and a tendency to use more scrap instead of primary-produced metal contributed to this situation.

(a) Copper

The world copper market remains depressed, with real prices at historically low levels, due to slack demand and excess supply capacity. Since the end of 1983, nominal prices for refined metal have fluctuated narrowly around an average of 64 cents per lb. This is below the average operating cost of many production units, some of which have been forced to close down, particularly in North America. Prices became firmer during the first part of 1987 as stocks were run down, but the large amount of excess supply capacity continues to dampen prospects for any significant increase in prices in the next few years. Consumption in developed countries will increase little in future, as the intensity of use of copper continues to decline in most end-use sectors, with the exception of wiring used in construction work.

In developing countries, copper consumption has for many years been much more buoyant than in industrialized countries. The future pace of consumption in developing countries will depend, however, on the extent to which those countries adopt new technologies - such as optical fibres in telecommunications - which have been largely responsible for lowering the overall intensity of the use of copper in industrialized countries.

(b) Aluminium

World consumption of aluminium outstripped production in both 1985 and 1986, in the latter mainly because of lower production in North America and Asia, which outweighed higher output in all other regions. This tight supply, caused mainly by smelter/cutbacks and strike action in the United States, contributed to a significant improvement in prices. In 1986, the price of aluminium was on average about 10 per cent higher than in 1985. Towards the end of the year, prices started to weaken, and prospects for 1987 and 1988 are bleak. World production of aluminium is forecast to increase by about 5 per cent in 1987 and 1 per cent in 1988. With consumption continuing its downward trend, the world aluminium market is expected to remain in surplus.

(c) Iron ore

World production, consumption and trade in iron ore remained relatively stable in

Box A1

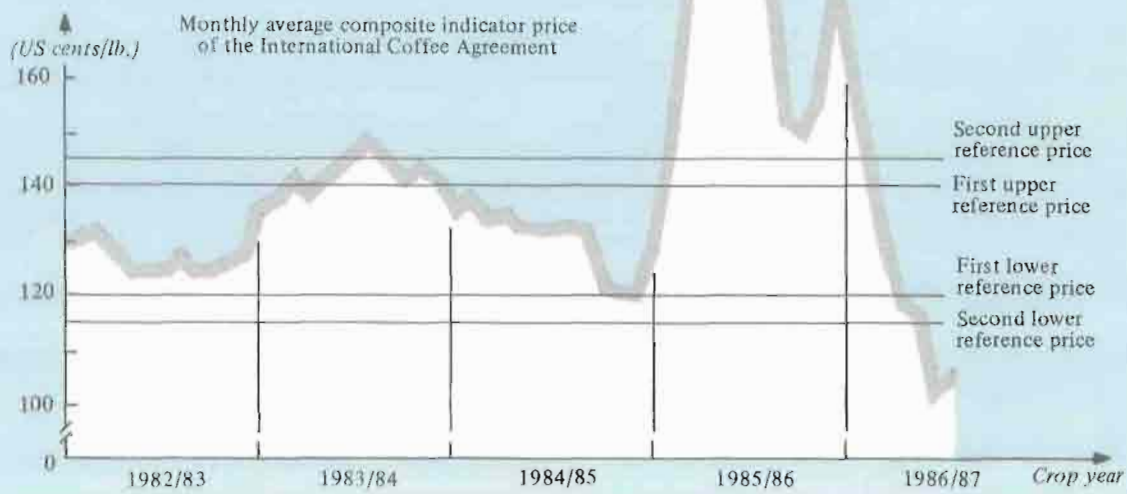
THE INTERNATIONAL COFFEE AGREEMENT AND COFFEE PRICES

Throughout the coffee crop years 1982/83 - 1984/85, global quotas established and adjusted under the International Coffee Agreement succeeded in maintaining the Agreement's composite indicator price within the agreed price ranges, except for a very brief period in May/June 1984 (see chart below). From the beginning of the 1985/86 crop year, however, prices began to rise steeply, when it was reported that the Brazilian crop had been severely damaged by drought. The monthly average composite indicator price, which in September 1985 was 118.78 cents per lb., rose to 174.84 cents in December 1985 and to 204.02 cents in January 1986, the highest level since the 1976/77 crop year, when damage to the Brazilian crop as a result of frost had pushed prices to levels even higher than those reached in 1986.

Under the terms of the International Coffee Agreement, quotas are suspended when the 15-day moving average of the composite indicator price remains 3.5 per cent above the second upper reference price for 45 consecutive market days, a condition which was fulfilled on 18 February 1986. Quotas were suspended, but this did not have an immediate effect on prices. It soon became evident that the increase in prices had largely been fuelled by speculation and that the anticipated shortfall was not likely to be as serious as at first believed. The result was an almost equally precipitous decline in prices, the monthly average composite indicator price falling to 149.12 cents per lb in July 1986. At that point, however, renewed speculation about the size of the Brazilian crop and anticipation of a shortage of supplies later in the year sparked off a new increase in prices, the monthly average composite indicator price rising to 181.45 cents per lb in September 1986. Once again, fears of a serious shortage of supplies proved unfounded and prices then declined rapidly and continuously over the next six months. By March 1987, the monthly average composite indicator price had dropped to 100.81 cents per lb, the lowest level since June 1981.

In normal circumstances, quotas under the International Coffee Agreement should have been automatically reintroduced when the 15-day moving average of the composite indicator price moved below the trigger of 134.55 cents per lb on 18 December 1986. However, during the annual renegotiation of quotas in September 1986, it proved impossible to reach agreement on their distribution for the 1986/87 crop year. Producers generally had proposed that the distribution formula should be the same as the one that had been in force throughout the life of the Agreement until quotas were suspended. Consumers, on the other hand, pressed for a redistribution of quotas that would match export entitlements more closely to export availabilities and demand patterns.

At the request of the producers, a further attempt was made, at the end of February 1987, to reach agreement on the distribution of quotas, but consumers continued to insist on changes in the distribution formula that proved unacceptable to producers, and in particular to Brazil, the largest producer, which refused to consider any reduction in its 30 per cent - or - so guaranteed share of the market. It has not, therefore, been possible to take action under the Agreement to support coffee prices, and it now appears unlikely that quotas will be reintroduced during the current crop year. If, when the time comes to distribute quotas for the crop year 1987/88, producers and consumers fail once again to reach agreement, the continued viability of the International Coffee Agreement could well be brought into question.



1985 and 1986.[154] However, this has not prevented further price declines, owing to the persistence of surplus capacity. The current imbalance, in which production capacity continues to exceed world demand by approximately 20 per cent, is affecting the present situation as well as the short-term outlook for iron ore. Structural and technological changes have been contributing to lowering demand, but increases in capacity due to previous investment decisions are still taking place, making the adjustment process more difficult. Recently, efforts have been made to improve the average utilization rates of the mines in operation, as well as to close a number of high-cost and depleting mines. Developments in the iron ore market in 1986 and 1987 also point to the vulnerability of the present price mechanisms and contractual arrangements. Current market practices, based on traditional long-term contracts containing flexible clauses for fixing both annual prices and annual quantities, are proving to be no longer adequate, since they cannot assure producers of finding outlets for their planned production. Consequently, 1986 and 1987 have witnessed some of the hardest and protracted annual negotiations on the basis of which a limited decrease in the dollar price of iron ore is envisaged.

(d) Tin

The weakening of the tin market came to a halt in June 1986, and as from August prices started to rise. In December 1986, the price of tin was already 20 per cent higher than in June. The strengthening of tin prices has been considered as an anomaly, given the large overhang of tin stocks. However, the negotiating efforts of the seven-nation Association of Tin Producing Countries (ATPC) brought about a significant reduction in exports for 1987. ATPC worked out individual quotas, limiting total exports to 96,000 tons. Two major non-ATPC producers - Brazil and China - have agreed to co-operate in the reduction of the stock overhang. The limitation of exports is expected to cut the current tin surplus of 70,000 tons by another 20,000 tons.■

154 See "Review of the current market situation and outlook for iron ore" (TD B IPC/IRON ORE/AC.1/2).

Annex 3

RECENT DEVELOPMENTS IN THE OIL MARKET

Oil prices plummeted from an average of around $28 per barrel at the end of 1985 to less than $10 per barrel in mid-1986. At the end of the summer they began to firm up, reaching on average $12-15 at the end of the year and $18 in the early part of 1987, and now stand at $18-19; in terms of the yen and the deutsche mark the current price is 60 per cent above the mid-1986 level.

The price collapse - which must be seen in the context of the structural changes undergone by the world energy economy in the 1960s and 1970s (see Box A2) - was triggered by OPEC's shifting its strategy towards increasing its market share. As explained in chapter II, section C, of the 1986 *Report*, OPEC members' total sales and revenues had been contracting much more rapidly than had been anticipated by those countries when prices rose in 1979, due to rising levels of non-OPEC production, conservation and substitution and to the slow-down of the world economy. A small number of OPEC countries with plentiful foreign-exchange reserves had shouldered almost all the burden of acting as swing producers, but eventually they too had become financially squeezed, with no prospect of relief in sight. For these countries, a strategy of increasing OPEC's and their own market share through price reductions appeared a more attractive long-term proposition than continuing to suffer output cuts.

It was argued by the proponents of the new strategy that competition from OPEC would induce those non-OPEC producers that had not been doing so, in particular those of the North Sea, to co-operate with OPEC by making voluntary production cuts, thereby allowing production programming to be re-established. Alternatively, it would cause the shutting-down of high-cost production and curtailment of new exploration and development, and stimulate an increase in the demand for oil via reverse substitution and accelerated growth in oil-importing countries.

Both possible outcomes, however, were fraught with uncertainty. The first assumed the willingness of two North Sea producers, who were also members of the International Energy Agency, to co-operate with OPEC. The second required OPEC countries to take revenue losses initially, with the amounts of the losses and the time-frame depending critically on the short-term elasticities of supply and demand. In practice, neither outcome materialized:

- The United Kingdom proved unwilling to make production cuts, despite the potential advantages in terms of current revenues and the life-span of oil reserves;
- It was found that since marginal variable costs tend to be low, even for producers with high average costs, relatively little non-OPEC production was vulnerable in the short term to a moderate fall in prices. Oil output outside OPEC countries did in fact fall in 1986, particularly in the United States, but this was largely because prices plunged to much lower levels than the architects of the market-share strategy had expected. However, investment by the oil industry slumped by 30 per cent worldwide, and 40 per cent in the United States;
- Oil demand proved to be inelastic, in part because the price fall was not fully passed through to the consumer. Oil consumption in OECD countries rose by some 2.5 per cent in 1986, partly because of a switch from coal to heavy oil; and for the first time in a decade, oil consumption exceeded that of other energy resources. However, these tendencies were very weak compared to the fall in prices;
- Moreover, far from inducing growth in oil-importing countries to accelerate, the price fall caused it to decelerate.

It thus became increasingly evident that the eventual benefits of the market-share strategy would accrue only after many more years, and involve much greater revenue sacrifices than had been thought. Because of the unexpected steepness of the price fall, this was even true for those OPEC members that had previously taken the brunt of production cuts and were therefore best placed to step up their output. For instance, the revenues of Saudi Arabia (which had cut output from 9.8 mb/d in

Box A2

THE CHANGING WORLD ENERGY ECONOMY

The 1960s and 1970s saw fundamental changes in the world energy economy. Control over oil production and pricing passed in successive steps out of the hands of the major international petroleum companies into those of the host countries; moreover, smaller oil companies increased their role in production and trade. These factors allowed producing countries in the early 1970s to take advantage of the strong upward trend in world oil consumption relative to known reserves by raising sharply the real price of oil, which had previously been declining.

As a result, the price of oil became one of the key macroeconomic variables in the world economy, and variations in its price began to exert a major influence on countries' balance of payments, inflation and growth performance, as well as on the distribution of world income. Moroever, because of the high liquidity preference of some of the major oil exporters, the rise in oil prices enlarged the share of international banks in bank deposits. At the same time, it increased the borrowing needs of oil-importing countries and the borrowing capacity of deficit oil-exporting countries. These factors had important consequences for the evolution of the indebtedness of developing countries, and hence for the international financial system as a whole.

The change in the system of ownership and control also made oil prices potentially more unstable. The loss of control by a handful of giant companies meant that the power to balance supply and demand in the market was now more widely dispersed; and, partly as a result, spot markets grew in size and assumed greater importance. Moreover, the behaviour of supply was exposed to new influences, since it was now determined by governments rather than companies. In determining their production levels, countries had to take into account a variety of objectives, including their debt positions and import requirements, and the pace of depletion of oil reserves.

This change was of fundamental importance, for it meant that if supplies were left to be determined by individual producers acting on their own, prices would tend to be highly volatile: producers would tend to emphasize conservation at times of strong world oil demand and financial ease, thereby causing the demand-supply balance to tighten and the market price to strengthen; and at times of weak demand and balance-of-payments pressure, to stress short-term revenue maximization, thereby adding to supply and further weakening market prices. To avert such instability, and its various adverse repercussions on the long-term supply of oil and on the world economy's macroeconomic performance, a high degree of co-operation among producers, and between producers and consumers, would have been required, especially in the face of fluctuations in aggregate world demand.

However, there were considerable differences among producers as regards such key factors as population, per capita income and oil reserves, and even larger differences, of both an economic and political character, between producers and consumers. In addition, as the rise in oil prices stimulated production of oil in new areas, substitution and conservation, the share of the principal oil exporters in world oil production fell, making it more difficult for them to tailor supply to match demand on their own. These factors played an important role in bringing about the collapse of oil prices in 1986.

1981 to 3.1 mb/d in 1985) fell by 25 per cent in the first half of 1986 from their level in the same period of 1985 despite a 37 per cent rise of production; its cash-flow position therefore deteriorated, instead of improving. Similarly, the revenues of Kuwait and the United Arab Emirates fell by one third.

The price collapse caused acute problems for other OPEC members, including some in the Persian Gulf. Many other developing country producers also suffered a sharp fall in revenues, particularly those that failed to adjust their prices in time and lost sales as a result. Oil-producing regions (such as Texas) in industrialized countries and oil and oil-related companies also found themselves hard hit. Financial institutions heavily exposed to energy-producing countries, regions and companies were also adversely affected. Moreover, United States oil production fell: by the fourth quarter of 1986 it was almost 7 per cent below the same quarter of 1985, and imports from developing countries had risen by 35 per cent; the reversal of the trend towards energy self-sufficiency prompted concern in that country regarding

energy security and consideration began to be given in Congress to an oil import tax.

This configuration of forces prompted OPEC to seek to put an end to the intense price competition prevailing among producers. In August 1986, production quotas were re-established, limiting overall OPEC production to 14.8 mb/d (excluding Iraq), down from 18 mb/d produced in June. Moreover, it was agreed that "all member countries should undertake to abide by and adhere strictly and seriously to the production levels ..." and that "in case any Member Country violates unilaterally this Agreement and exceeds its temporary, allocated production level, in whole or in part, and such violation is confirmed, other Member Countries will consider themselves free of their obligations under this Agreement. However, this matter shall be examined in an Extraordinary Meeting of the Conference...". Moreover, there was an understanding that Saudi Arabia would no longer bear a disproportionate share of the "swing producer" burden. The August decisions led to a firming of market prices.

Co-operation among OPEC members strengthened in the subsequent months, and in December an official selling price of $18 per barrel was established; this was expressed in terms of a basket of seven crudes, including Mexican Isthmus; thus, Saudi Arabian light would no longer provide the sole reference price. The overall production ceiling of 15.8 mb/d set for the first half of 1986 was lower than the level of residual demand (after making allowance for the voluntary restraints of a number of non-OPEC producers), which allowed prices to firm up in the first quarters of 1986 despite destocking. After a period of renewed instability, the market price became somewhat more stable, at around $18.

However, a number of basic issues remain unresolved:

- Demand for OPEC oil was strengthened by the severe European winter, and there is still a heavy overhang of stocks;
- If growth of the world economy remains sluggish, with OECD countries expanding at considerably less than the 3.0 per cent rate required to prevent their oil demand from falling, OPEC markets will continue to be weak. The fact that prices are lower than before the price collapse will eventually help to increase the demand for OPEC oil, but how far and how fast is none too clear;
- The extent to which non-OPEC producers will co-operate in adjusting supply to demand is also difficult to predict.
- The determination of OPEC members to abide by the quotas that have been set will continue to be tested by the intense financial pressures on most of them, including those stemming from military expenditures and/or debt service;
- It remains to be seen how the swing producer burden will be shared. The present system of setting *both* official selling prices for certain crudes *and* production quotas for individual countries unwittingly tends to assign that role to one or two countries. This is because, while the production quotas and price targets set may be roughly compatible with one another, in practice some divergence is bound to emerge; if official prices for different crudes are set at precise figures (as at present) such divergences will naturally be reflected in the production levels of countries such as Saudi Arabia which account for the bulk of OPEC production of crudes subject to official selling prices;
- OPEC continues to lack a long-term price strategy.

It is therefore too early to conclude that a regime of stable and predictable prices is now in place. Even if a more efficient system of distributing the swing producer role were devised - for example, by allowing prices to fluctuate within a range, while adjusting production quotas periodically to achieve a target price - the financial pressures on OPEC countries would continue to be strong, particularly if the world economy expands slowly. One possible response to mounting pressures may be another price collapse; however, by checking new investment exploration and development, this could lead to shortages and soaring prices a few years later. Alternatively, OPEC might opt for enlarging its current revenues by raising prices and cutting production further; but this might in turn trigger another price collapse later on. In either case, prices would continue to be volatile, with disruptive effects of various kinds for producers, consumers and the world economy in general.

On the other hand, there is little reason to think that an acceleration of world economic growth by one or two percentage points would cause prices to rise sharply. For one thing, there is a very large margin of spare capacity in oil-producing countries. For another, these countries have a heavy pent-up demand for imports and financial assets, and, in some cases, a considerable debt and debt-servicing burden.

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Annex 4

RECENT DEVELOPMENTS IN INTERNATIONAL CAPITAL MARKETS

A. Some recent trends in borrowing from the international capital markets

In 1986, as in 1985, there was a vigorous expansion of private international lending. The expansion of 1986 included not only bond issues and Euronote facilities[155] but also syndicated bank loans (the only one of these three categories which failed to increase in 1985). As a result net lending (excluding the effects of exchange-rate movements) in the form of international security issues and changes in the external claims of banks in the reporting area of the Bank for International Settlements (BIS) increased from $175 billion in 1985 to $240 billion in 1986.[156]

However, for the great majority of developing countries the years 1985-1986 were marked by continuation of the sharply reduced levels of borrowing from the international capital markets which have prevailed since 1982. This contraction has affected bank loans, bonds, and medium-term and long-term export credits. Indeed, figures for 1985 indicate that net flows of medium-term and long-term financing at 1984 prices and exchange rates (including direct investment from DAC member countries) had fallen by more than 50 per cent since 1982 and by well over 60 per cent since the peak level of 1981.[157] Of the major categories of lending to developing countries by the capital markets, total export credits, which had contracted in 1984, expanded vigorously in 1985 (as is shown in Annex table 15) owing to the increase in those at short-term maturities, but this was the main exception to a general pattern of slow growth.

A significant part of the expansion in activity in the international capital markets during 1986 was due to the levels of interest rates. For example, Eurodollar and Euroyen rates tended to decline during most of the year, and many other major international interest rates remained below their levels of the first half of the 1980s. Such interest rates acted as an incentive to the refinancing of lending in the form of bonds, and to new borrowing designed to take advantage of favourable market conditions. The failure of low interest rates to revive borrowing by developing countries reflected factors on both the demand and the supply sides. For a few countries, whose access to international capital markets was not affected by the debt crisis, low levels of borrowing were the result of policy decisions. For others they reflected, in varying degrees, the influences of demand depressed by deflation associated with external financial stringency, and of costs of, and other impediments to, borrowing not reflected in international interest rates.

Thus the developing countries of South and South-East Asia continued to borrow from banks during 1986 at about the same pace as during the previous year (as is shown in Annex

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155 Euronote facilities include underwritten facilities (such as Note Issuance Facilities and Revolving Underwriting Facilities) and non-underwritten or uncommitted facilities (such as Euro-commercial paper programmes).

156 Bank for International Settlements (BIS), *International Banking and Financial Market Developments* (Basle, April 1987), p.22.

157 OECD, *Development Co-operation, 1986 Report* (Paris, 1987), table III.1, and *Geographical Distribution of Financial Flows to Developing Countries*, various issues.

table 13). They issued new external bonds at a slower pace than in 1985.[158] A number of the countries in this region have not been affected by the restrictions on access to external borrowing which have so widely affected developing countries since the outbreak of the debt crisis in 1982. The relatively low levels of borrowing by these countries in recent years are a reflection of their cautious policies in this regard, and have been associated in many instances with considerable improvements in balances on current account. For two of the borrowers in this region (Republic of Korea and Taiwan Province of China) these improvements amounted to more than $10 billion in 1986. Taiwan Province of China reduced its borrowing from banks in each of the years 1983, 1984 and 1985, though available data indicate that it was a net borrower in 1986.[159] The Republic of Korea plans to amortize $12 billion of its foreign debt between 1986 and 1991,[160] and its liabilities to international banks declined in 1986. However, the counterpart of these shifts on current account is an improvement in the countries' trade balances which is now leading to resistance on the part of the United States, their largest export market.

In other regions low levels of borrowing by developing countries were due to the impact of the interaction of world economic conditions and the overhang of existing debts on the availability and terms of international financing, and to the continuing effects of policies adopted in these countries in response to external financial stringency. For example, these policies have led to widespread reductions in investment, and have thus played a particularly important role in depressing demand for medium-term and long-term export credits, which are used principally for purchases of capital goods. Reductions in the demand for borrowed funds have been accompanied by restrictions on lending on the part of the principal entities on the creditor side - banks, suppliers and export credit agencies (ECAs). As a result of such factors net transfers of financial resources to many developing countries dependent on the international capital markets to meet their external financial requirements continued to be low or negative.

For example, the exposure of banks in the reporting area of the BIS to a group of countries in Latin America and the Caribbean grew by about 0.9 per cent ($2.3 billion) in 1986 (the change actually being negative after adjustment for exchange-rate effects).[161] This fall reflected, *inter alia*, the continuing absence of a revival of voluntary lending to countries experiencing difficulties over debt service in this region[162] and a contraction of "involuntary" lending. After allowance for net payments of profits and interest, the net financial transfer from all sources to the countries in Latin America and the Caribbean, which has been negative in all years since 1982, is estimated to have amounted to about -$22 billion in 1986.[163] The figures in Annex table 13 for Africa as a whole show a continuation in 1986 of the rapid pace of net borrowing attained in 1985 (which was influenced by a revival of officially-guaranteed short-term trade financing for many countries in this region). However, an even larger part of the net borrowing in 1986 than in 1985 was due to a small number of major oil exporters. Indeed, net transfers from private creditors to countries of sub-Saharan Africa, which have been particularly affected by the contraction of lending in the form of medium-term and long-term export credits, fell to a figure of -$3.2 billion in 1985.[164] For many developing countries experiencing negative net transfers of funds from the capital markets, such borrowing as they managed to undertake could be regarded as making possible the "recycling" of interest payments.

The recent period has witnessed widespread further discussion of the subject of capital flight from developing countries and its implications. This discussion continues to be bedevilled by the difficulty of arriving at an operational definition of the phenomenon. A number of the initial attempts at estimating its

158 OECD, *Financial Market Trends*, No. 36, February 1987, p. 93.

159 BIS, *op. cit.*, table 4a.

160 Morgan Guaranty Trust Company of New York, *World Financial Markets*, January 1987, pp.8-9.

161 Figures adjusted for exchange-rate effects for non-oil-exporting countries in Latin America and the Caribbean are given in BIS, *op. cit.*, p.10. Inclusion of the region's major oil exporters would probably further decrease the figures (*ibid.*, table 4a).

162 Part of this decline is likely to have been due to factors other than actual flows of funds such as the writing down of the book values of claims, sales of claims to entities other than banks in the BIS reporting area, debt-equity swaps and transfers of claims to ECAs. BIS, *International Banking Developments, Third Quarter 1986* (Basle, January 1987), pp. 11-12.

163 CEPAL, "Preliminary Overview of the Latin American Economy 1986", *Notas sobre la economia y el desarrollo* , No. 438 439, December 1986, table 14.

164 World Bank, *World Debt Tables. External Debt of Developing Countries 1986-87 Edition* (Washington, D.C., 1987), p. 31.

magnitude focused on that part of accumulated external debt which was not accounted for by the deficit on trade, by debt-service payments and outflows of income on direct investments, and by increases in official reserves and in the external assets of commercial banks. However, this definition is open to various criticisms. For example, it includes in capital flight the working balances of foreign currency held by domestic non-bank enterprises. Moreover, it could be influenced in various ways by the vagaries of national systems for reporting the size of their external debts and of their trade and current-account deficits. Furthermore, for some countries the external liquidity squeezes resulting from their difficulties over debt service caused widespread discontinuance of their arrangements for trading on open account, thus probably leading to substantial outflows of foreign exchange which would be statistically indistinguishable from capital flight under this definition.[165] Finally, the underinvoicing of exports and the overinvoicing of imports are excluded from such an estimate of capital flight.

These uncertainties over definition have made it difficult to do more than arrive at highly approximate estimates of the size of capital flight. Nevertheless, there seems to be a measure of agreement that the scale of net outflows on this account was substantial in the early 1980s for a number of countries, sometimes amounting to significant proportions of accumulated external debt, but that it has subsequently contracted, in some cases probably owing to the repatriation of previous outflows. For example, in four of a group of five Latin American countries available estimates of capital flight in a recent survey of IMF[166] suggest that it has declined since 1983.

Despite the recent fall in outflows, the total value of the external assets of persons and entities in developing countries which can be classified as flight capital remains large. If that part of these assets held in the form of deposits (which were actively solicited by international banks in some debtor countries) were to be fully included in countries' financial positions vis-à-vis their creditors, their indebtedness on a net basis would sometimes be substantially reduced in comparison with that on a gross basis. In view of the magnitude of flight capital (and the probably negligible contribution which income on it is currently making to the debt-service capacity of its countries of origin), efforts to repatriate it have now become part and parcel of policies for handling their external debt problems in several developing countries.

The continuing stagnation or decline of financial flows to the great majority of developing countries from the international capital markets has helped to strengthen the belief that current approaches to handling developing countries' debt problems are not working. Since 1985 the debt strategy of the governments of the major OECD countries has been based on the proposition that financing should be provided by banks and multilateral financial institutions in support of comprehensive programmes in debtor countries of growth-oriented adjustment which would entail shifts towards greater reliance on the private sector, the curtailment of subsidies and price controls, measures to stimulate foreign as well as domestic investment, and export promotion and trade liberalization. This proposition was embodied in the initiative of Secretary Baker, when he proposed a "Programme for Sustained Growth" in October 1985 directed at 15 developing countries with large debts to international banks. Under this proposal the banks were to provide $20 billion of new lending during a period of three years. At the time when this initiative was launched, it was widely questioned whether the levels of financing envisaged would be sufficient for achieving its objectives. But in the event, the pace of lending has fallen short of even these levels, and until the Mexican agreement of 1986 (discussed below in section B) the initiative appeared to have had no influence on debt renegotiations.

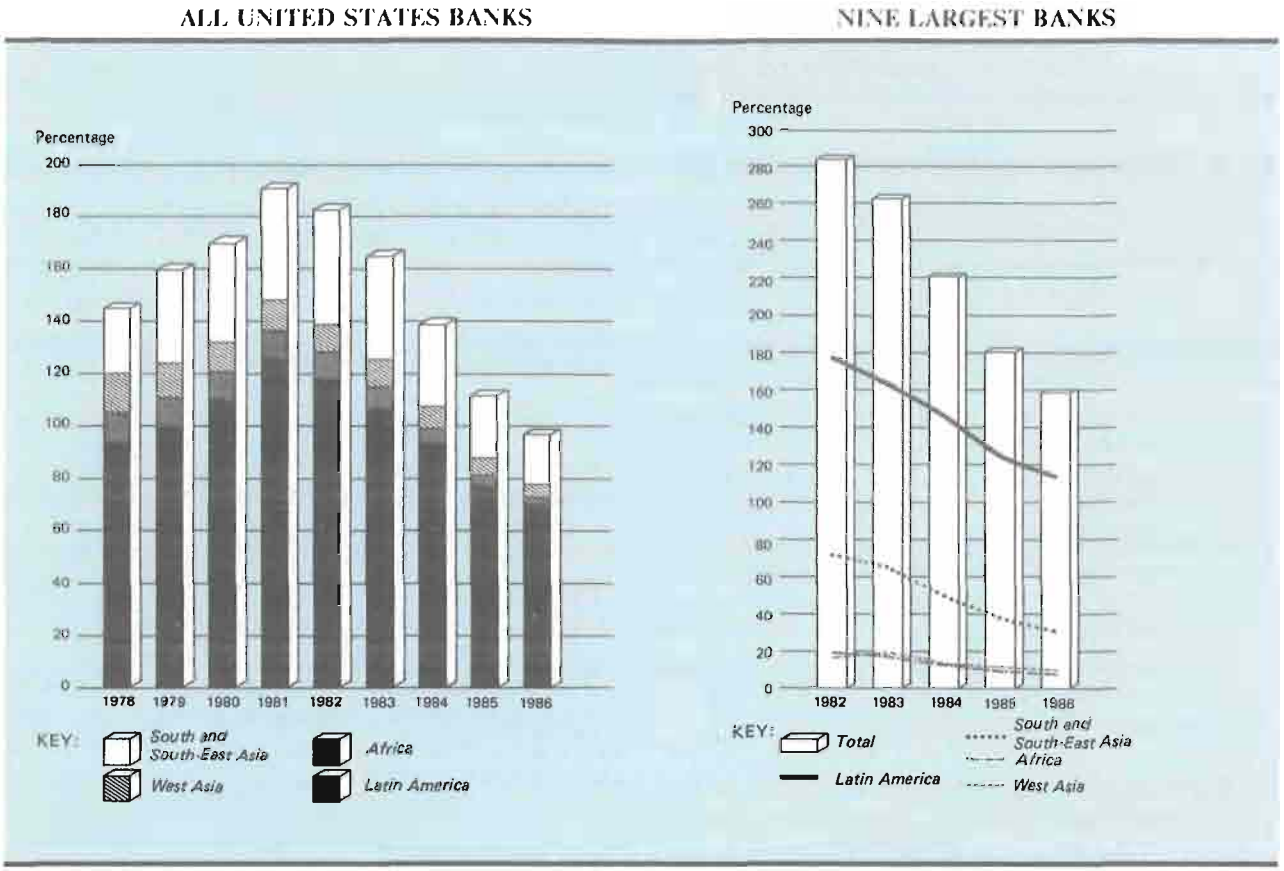
This lending shortfall took place during a period when there was a widespread strengthening of the financial positions of many major international banks. For example, as shown in Chart A-V and Annex table 14 the exposure to developing countries of banks in the United States declined from a peak of more than 190 per cent of capital at the end of 1981 to less than 100 per cent in September 1986. In the case of the nine largest banks, whose exposure to developing countries was much greater than the average, the decline was from 284 per cent of capital (at the end of 1982) to 159 per cent. By early 1987 the banks of some OECD countries had established substantial loss reserves against their exposure to developing countries, but this did not yet appear to be true of the

165 "Trade financing for developing countries: some aspects of current difficulties and policy responses" - study by the UNCTAD secretariat (TD B C.3 212), para. 23.

166 M. Watson, R. Kincaid, C. Atkinson, E. Kalter and D. Folkerts-Landau, *International Capital Markets Developments and Prospects*, IMF World Economic and Financial Surveys (Washington, D.C., December 1986), table 52.

Chart A-V

CLAIMS OF UNITED STATES BANKS ON DEVELOPING COUNTRIES AS A PERCENTAGE OF THEIR CAPITAL



Source: See Annex table 14.

banks in the countries with the greatest exposures to troubled debtors.[167] However, in May 1987 two United States banks announced that they were increasing their loan loss reserves by amounts corresponding to between 20 and 30 per cent of their outstanding loans to developing countries. At the time of writing it was not clear whether similar provisions would be made by other banks with large exposures to such countries (although some further movement in this direction seemed likely).

Yet, despite the widespread improvements in their financial positions, banks have remained reluctant to increase their involvement in most forms of lending to troubled debtor countries. Indeed, as the World Bank has put it, "As banks have strengthened their financial ratios and feel themselves less exposed to the dangers of a breakdown... they have stiffened their resistance to pressing appeals for new money".[168] As in earlier phases of the debt crisis, the resistance has been especially marked among banks with relatively low exposures to troubled debtors. Moreover, it frequently continues to impede the reaching of agreements on the rescheduling of developing countries' debts to banks, thus protracting debt renegotiations and increasing their costs and the uncertainties as to their outcomes.

Banks' reluctance to make new loans to a large number of developing countries is closely related to the overhang of existing debt and to the weakness and unevenness of global economic recovery since 1982 (whose consequences for recent trends in key indicators of the debt position of selected groups of these countries and their interest costs are illustrated in Box A3. Since global economic conditions seem unlikely to validate the current debt strategy of the governments of the major OECD countries, the search for alternative approaches has recently been intensifying. The

167 P. Montagnon, "Banks slow to build reserves", *Financial Times*, 20 November 1986; and D. Lascelles, "Cushioning provisions made by banks vary", *Financial Times*, 6 March 1987.

168 World Bank, *op. cit.*, pp. ix-x.

Box A3

SELECTED INDICATORS OF EXTERNAL DEBT POSITIONS AND REAL INTEREST COSTS OF CAPITAL-IMPORTING DEVELOPING COUNTRIES AND TERRITORIES ON ALTERNATIVE ASSUMPTIONS, 1981-1986

	1981	1982	1983	1984	1985	1986
Ratio of debt to exports of goods and services (per cent)						
All countries [a]						
- actual	137.5	166.0	182.0	173.5	188.8	201.7
- at 1981 export prices	137.5	155.6	162.7	155.1	164.1	159.5
Highly indebted countries [b]						
- actual	208.9	267.4	300.4	284.5	302.1	358.7
- at 1981 export prices	208.9	252.3	268.0	254.1	264.1	284.4
Low-income countries [c]						
- actual	184.3	221.3	252.1	244.5	285.9	351.9
- at 1981 export prices	184.3	211.3	228.1	223.9	251.6	267.0
Ratio of interest payments to exports of goods and services (per cent)						
All countries [a]						
- actual	13.1	15.5	15.5	15.2	14.7	13.7
- at 1981 export prices	13.1	14.6	13.9	13.5	12.7	10.8
Highly indebted countries [b]						
- actual	23.6	30.5	31.3	30.2	28.4	29.1
- at 1981 export prices	23.6	28.8	27.9	26.9	24.8	23.0
Low-income countries [c]						
- actual	8.4	10.1	10.9	11.3	12.3	13.8
- at 1981 export prices	8.4	9.6	9.9	10.3	10.8	10.5
Interest rates and changes in export prices (per cent)						
All countries [a]						
- implicit interest rate [d]	9.5	9.4	8.5	8.7	7.8	6.8
- export price change	-0.7	-8.1	-5.6	0.2	-3.4	-11.1
Highly indebted countries [b]						
- implicit interest rate [d]	11.3	11.4	10.4	10.6	9.4	8.1
- export price change	-0.6	-7.1	-6.3	0.2	-2.6	-12.1
Low-income countries [c]						
- implicit interest rate [d]	4.6	4.5	4.3	4.6	4.3	3.9
- export price change	0.7	-5.6	-6.5	1.3	-4.2	-16.5

Source: UNCTAD secretariat estimates based on World Bank, *World Debt Tables. External Debt of Developing Countries, 1986-1987 Edition*; IMF, *World Economic Outlook*, April, 1987; UNCTAD, *Handbook of International Trade and Development Statistics*, various issues.

a I.e. all capital-importing developing countries.

b Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Côte d'Ivoire, Ecuador, Jamaica, Mexico, Morocco, Nigeria, Peru, Philippines, Uruguay, Venezuela and Yugoslavia.

c All capital-importing countries with a per capita GDP of less than $500 in 1980.

d Ratio of interest payments during the year to total debt outstanding at the end of the year.

(Continued on the following page.)

Box A3 (continued)

The first two sets of time series in the table above indicate the recent evolution of the ratios of total (short-term and long-term) external debt, and of interest payments on such debt, to the exports of capital-importing developing countries. They show the continuing rises in the debt-export ratios of the different groups of countries in the face of the strategies for handling their debt problems which have been tried so far. They also show that the decreases in the interest payments-export ratios from their 1983 levels have been relatively small for the aggregate of all capital-importing countries and the highly indebted countries, while this ratio continued to rise significantly in the case of the low-income group. One factor which has made an important contribution to the poor performance of these ratios has been the sharp decline in the average prices of developing countries' exports. An indication of the impact of this decline on movements of these ratios can be obtained from the time series in the table calculated on the assumption of constant export prices at their 1981 levels. In all cases the two ratios are lower on this assumption. The time series for interest rates give an indication of the impact of the declines in nominal interest rates on the cost of debt service since 1981 for countries with significant amounts of variable-interest rate debt (a category which largely excludes low-income countries, whose debt mostly carries fixed rates of interest). However, they also show that the unfavourable movements of export prices have for many countries largely or wholly offset these declines.

approaches canvassed, some of which are discussed in greater detail in section B below, include initiatives intended as major steps towards the solution of developing countries' debt problems as well as proposals of more limited scope directed at alleviating the effects of the debt overhang and facilitating debt renegotiations.

The first set of proposed approaches includes the widely discussed idea of a refinancing mechanism for the existing overhang of debt as well of partial write-offs of such debt (sometimes combined in both cases with concessions as regards levels of interest rates). As is often pointed out in this context, such approaches would entail a complex process of formally agreeing on the distribution of the costs involved and would have effects on the availability of new private lending which are difficult to predict. Moreover, as is noted in section C below, it might be argued that action along these lines would constitute a precedent for the treatment of other non-performing assets, whose amounts are substantial in certain sectors of some OECD economies. Such considerations have continued to impede initiatives of this kind.

The more limited proposals include various market-related mechanisms designed to alleviate the impact of developing countries' existing debt overhang by reducing debt-service payments or attracting new equity funds (or both). One much-discussed mechanism of this kind involves debt-equity swaps, schemes for enabling which now exist in a number of countries.[169] Another proposal for a market-related mechanism, designed to facilitate the rescheduling process, is that for "exit bonds", which would have the effect of making it possible for banks to terminate their exposure to a country, while also amortizing part of its outstanding debt.

On the debtors' side the ever-receding prospect of an end to external financial stringency is increasing dissatisfaction with the present approach to the debt problem. An important aspect of this dissatisfaction is the growth of pressures for alternative approaches which would tailor debt-service payments more closely to borrowers' capacity to pay. In principle, such adjustment of debt-service payments should be a major consideration in any rescheduling exercise. However, discontent with the results actually achieved by debt renegotiations is reinforcing the demands of many borrowing countries for more flexible formulas for debt service. Pressures for the adoption of such formulas have been dramatized during the last two years as a result of the unilateral imposition by a small number of countries of limits on the size of their debt-service payments.

169 For a discussion of other closely related market mechanisms which would have similar effects see P. de Svastich, "A market approach to debt reductions", *The Banker*, September 1986.

B. Renegotiations of bank debt and new approaches to handling debt problems

1. *Overall assessment of renegotiation of bank debt*

The continuous process of renegotiating bank debts since 1982 has weakened the cohesion of groups of creditor banks, and the resulting signs of strain have recently become increasingly evident. One such sign, namely the resistance of banks with relatively low exposures to troubled debtors to participation in the provision of new money, was mentioned in section A above. Different degrees of exposure were not the only source of divergence of approach within creditor groups. These divergences were also associated with the size of banks, the extent of their business interests in debtor countries, and differences in the national regulatory frameworks[170] to which they were subject. For example, large banks with operations to protect in developing countries or with links to them through transnational corporations among their clientele tended to be more willing to maintain or expand their exposure.

These divergences of approach have led to discussions concerning the possibility of changing the basis for burden sharing among banks,[171] and of establishing a size limit for exposure below which banks would not be approached as part of debt renegotiations or, alternatively, would be given some form of special treatment. Moreover, the government of a major OECD country has expressed its support for the use of alternative financial mechanisms as part of a more flexible approach (sometimes described as the "menu approach") to encourage banks to continue to participate in international lending.[172] So far these initiatives seem to have led to concrete results only in the recent rescheduling agreements in principle between Argentina and the Philippines and their bank committees (some aspects of which are described below). In the meantime the increasing difficulties being experienced in the renegotiation process are impeding agreements on debt restructuring and the provision of new money, and are causing long delays between the dates of agreements in principle and those of actual signatures.

In consequence, there were disappointingly few developments in rescheduling agreements in 1986. Seven developing countries negotiated agreements in that year with commercial banks[173] - Brazil, Congo, Côte d'Ivoire, Mexico,[174] Nigeria, Uruguay and Zaire - compared with nine in 1985. The amount of debt restructured was $57.4 billion, but most of the increase in comparison with the 1985 figure of over $13 billion was due to the Mexican agreement, which accounted for $43.7 billion. The amount of new money disbursed for the year ($2.6 billion) represented about half the amount reached the previous year. One of the disappointments in the renegotiation process is that the practice of multi-year rescheduling agreements (MYRAs), which is intended to support medium-term adjustment programmes and provide longer planning horizons, has not yet caught on to a greater extent. Only four of the seven agreements signed in 1986 (those with Congo, Côte d'Ivoire, Uruguay and Mexico) were MYRAs. The amount of debt involved in the MYRAs other than that with Mexico ($2.9 billion) was far less than in earlier years. For the other three restructurings, creditors preferred to go back to the practice of short-term agreements. In the first four months of 1987, agreements in principle on MYRAs were reached with Chile,[175] Philippines and Argentina. Moreover,

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170 See *Trade and Development Report 1985* (United Nations publication, Sales No. E.85.II.D.16 and corrigendum), para. 258.

171 Since banks are asked in debt renegotiation agreements to put up new money in proportion to their exposure to the debtor concerned, many, which have since 1982 reduced their exposure, see no reason why they should continue to participate. Formally accepting this position, however, would mean that those banks which have contributed to increases in exposure would be penalized.

172 Remarks of the United States Secretary of the Treasury to the Interim Committee of the International Monetary Fund, 9 April 1987.

173 World Bank, *World Debt Tables. External Debt of Developing Countries, 1986-87 Edition* (Washington, D.C., 1987). For these seven agreements were reached in principle or signed during the year.

174 The Mexican agreement was to modify the terms of the 1984 Mexican MYRA.

175 Chile obtained a cut in interest rate costs to LIBOR + 1 per cent on its restructured debt (still higher, however, than the rate agreed in the 1986 Mexican agreement). One of the novelties of the agreement was a "re-timing" of interest payments, whereby the country would make interest payments once a year instead of the usual twice a year. This reduced the amount of money the country needed to raise.

Venezuela was accorded the reduction in margins and extension of the repayment period which it had been seeking as a revision of an earlier debt renegotiation.

However, at one point during the year, the agreement reached by Mexico and its creditor banks had seemed to open new horizons. Mexico was the first country to win a package corresponding to the lines of the plan proposed in 1985 by Secretary Baker. One of the distinctive features of this package is that it explicitly links its terms to economic growth and the ability to meet debt-service payments.[176] But whether the agreement obtained by Mexico in 1986 sets a precedent for other negotiations is highly uncertain. It appears to have been reached only after the exercise of considerable pressure on banks by the main creditor governments. At present it seems there is strong resistance by banks to extend to other debtors many of the conditions included in the arrangement. In the case of the debt renegotiation with the Philippines (in late 1986 and early 1987), for instance, bankers resisted committing themselves to the type of contingency loan scheme included in the Mexican package. They also expressed strong reluctance to extend to other countries margins over LIBOR as low as those granted to Mexico, and gave a clear message to this effect in the negotiations held in early 1987 with Argentina, Chile, Philippines and Venezuela.

A more positive feature of debt negotiations in 1986 was the continued reduction of margins as part of bank debt restructurings and financial packages. However, some of these reductions were not agreed without difficulty and the level of margins is frequently still a bone of contention in debt renegotiations. More generally, some observers believe the approach to handling debtor countries' problems based on MYRAs to be flawed, since it leads to the piling up of additional debt. Thus, the whole process may fail to achieve the intended results if the debtors' export earnings do not grow fast enough to service both the new and the existing debt.

2. *Alternative approaches to debt overhang*

In view of the unsatisfactory features of current approaches to the problems associated with developing countries' debt overhang, the search for alternative solutions continues. A common feature of many of the alternatives so far proposed is that they are designed to achieve a reduction in the outstanding stock of debt. One of these approaches, which has actually been put into practice is that of debt-for-equity swaps. There are basically two ways to convert debt into equity: a lending bank can simply agree to do the conversion and still hold the assets on its own books; or else it can sell its debt at a discount to a foreign investor or a resident in the country, who may then seek redemption of the claim in local currency, using the proceeds to finance its investment. While the first way may face a number of regulatory barriers (in both debtor and creditor countries), the second route has been more extensively explored in recent years. To encourage it, a number of countries have set up formal debt-to-equity conversion schemes whereby the new holder of the foreign claim on the country is able to exchange it for local currency at its full face value or at a smaller discount than the one obtained at the time of the purchase, and then use the proceeds for investment in the country in question. The strength of the incentive provided by the government lies mainly in the gap between the discount rate at which the investor buys the foreign-exchange claim and the rate applied for the conversion into local currency. Countries such as Argentina, Brazil, Chile, Costa Rica, Ecuador, Mexico, Philippines and Turkey, for instance, have already established debt-equity conversion schemes (some of them only for a limited period of time or for certain types of debt), and the introduction of the practice gained greater momentum in the course of 1986. In April 1987, Venezuela issued regulations concerning debt/equity swaps for the public sector and the capitalization of private sector foreign debt. These regulations are expected to open the door to a significant volume of transactions.[177]

However, the enthusiasm which initially accompanied the debt-for-equity schemes has tended to subside. This is due to to the growing reservations concerning such schemes. First, it is argued that, in some instances, foreign in-

[176] Other striking features of the package were the level of the margins over LIBOR (at 13 16, the lowest obtained in years by a rescheduling country) and the long maturity period for the refinancing of the amount already rescheduled in 1985 (20 years instead of 14).

[177] *Financial Times*, 22 April 1987. Up to now, debt capitalization had been approved on a limited scale in Venezuela, and swaps had not been allowed at all.

vestment would have taken place even without the debt-equity scheme.[178] Secondly, the amount of new money obtained in future debt restructurings may diminish as a result of the reduction in outstanding external debt. Thirdly, there is a danger that investors will repatriate their funds soon after the swap has taken place, in which case there will be an actual diminution of financial resources for the country. Fourthly, opponents of the swaps argue that they allow foreigners to exchange non-performing debt for control of viable domestic assets at a discount. Finally, one powerful concern relates to the possible adverse impact of conversions on monetary and fiscal policies in debtor countries: the danger that the mechanisms for providing the counterpart in local currency of the debt covered by the swaps will lead to loss of control of the money supply, thus fuelling inflation.

Debtor countries have tried to remedy some of these problems. Some of them, for instance, require foreign investors to bring in foreign exchange additional to that covered by the conversion.[179] To deal with the issue of excessive expatriate control, special safeguard measures can be adopted to prevent foreign domination of existing companies.[180] In almost all cases, limits have also been imposed on the repatriation of profits and capital to avoid early capital outflows for the debtor country. At the same time, however, a delicate balance has to be struck between the problems and the remedies, as schemes must remain attractive to investors.[181] As to the problems related to monetary control, the central bank could in principle neutralize the monetary consequences through policy actions offsetting the additional liquidity, though this may not be possible in practice if the swap volume is large in relation to the country's monetary base.

Experience so far indicates that debt-for-equity schemes are likely to involve only limited amounts of developing countries' external debt. For instance, the swap volume of five countries (Argentina, Brazil, Chile, Mexico and Philippines) represented by the end of 1986 less than 2 per cent of their total debt.[182] There are also other significant restricting factors. First, big banks with large exposures have clearly been reluctant to trade their own huge portfolios of problem loans since they would have to record sizeable losses on the transactions, given the high discounts prevailing in the secondary markets for debt. However, the recent steps of two large United States banks to increase their loan loss reserves (which were mentioned in section A) signal a willingness to acknowledge such losses, which can be expected to result in greater flexibility as regards selling problem loans in secondary markets. Secondly, many investors may be reluctant to invest in countries which are plagued by economic difficulties and tend thus to offer few attractive opportunities. Finally, there is an inherent constraint in the potential of debt-equity swaps which stems from the amount of foreign investment that can be accommodated by a debtor country in relation to its external debt. For instance, Latin America's external debt is four times as large as the stock of foreign direct investment in the region. One cannot reasonably expect such a gap to be filled without radical shifts in the ownership of enterprises in the debtor countries. As a result, it is widely believed that "although the use of swaps will no doubt continue to grow, they are not a panacea for the debt problems of third world countries and obviously are not going to replace the need for periodic debt reschedulings".[183]

Up to now the debt-for-equity approach is one of the rare techniques that has been implemented in a formal way to deal with the debt problem. During 1986 various other proposals also received substantial attention. For instance, an alternative debt plan was presented in mid-1986 by United States Senator Bradley, who proposed a three-year relief package: interest rates would be reduced each year by 3 percentage points on debt owed to governments or commercial banks; the outstanding

178 As Rudiger Dornbusch, Professor of the Massachussets Institute of Technology, has put it, "In nine out of ten swaps, it is one big rip-off. The investment would have come anyway, and with a swap the central bank is saddled with paying an unnecessary subsidy to provide the local currency." (*Institutional Investor*, February 1987, p. 115).

179 In a new debt-for-equity scheme, for instance, Argentina proposes that there must be a dollar-for-dollar matching of the nominal amount of the swap with fresh investment funds. (*Institutional Investor*, February 1987.)

180 A number of countries already have laws relating to foreign ownership (or participation) in domestic enterprises.

181 This explains, for instance, the delays in the adoption of a new debt-for-equity programme by Argentina. Late in 1986, the country's Minister of Economics told creditor banks that their proposals on debt-for-equity swaps were not acceptable, while adding that it was worth discussing the issue of debt capitalization (*Institutional Investor*, February 1987). It is noteworthy, too, that the debt-swap programme hailed as the most successful is that of Chile, a country with few barriers to foreign investment.

182 Mexico, which established new rules in its mid-1985 conversion programme, expects that $2.5 billion in debt will have been converted into equity by end-1987, but that is no more than 2 per cent of its present outstanding external debt. (*Latin American Weekly Report*, 23 October 1986.) The most optimistic seems to be Chile, which hopes to convert about 13 per cent of its $27 billion debt into equity. (*Ibid.*)

183 A. Marton, "The debate for debt-equity swaps", *Institutional Investor*, February 1987.

debt stock would be written down by 3 per cent each year; and these measures would be accompanied by additional financial flows to support structural adjustment in countries covered by the programme. The proposal has met with mixed reactions, many financial circles stressing its limited benefits and its likely adverse effects on the debtor countries' borrowing prospects.[184] The latter point was particularly emphasized by the Chairman of the United States Federal Reserve Board in a comment on the plan.[185] Indeed, he expressed the view that adoption of the plan would also adversely affect the supply of lending to developing countries other than those benefiting from the proposed relief. However, these reactions preceded the decisions (mentioned above) of two large United States banks to make increases in their reserve for losses on their exposure to developing countries. These increases involve amounts greater than those in the writing-down of debt proposed by Senator Bradley. It is not yet possible to judge what the effects on lending to developing countries will be of these decisions and any analogous steps which may eventually be taken by other banks. However, greater willingness by banks to acknowledge the impairment of the value of loans to developing countries, combined with the disillusionment provoked by the continuing crisis associated with the present debt strategy, may produce a more favourable attitude to schemes such as the Bradley plan.[186]

Another approach is close to actual implementation in Japan. It is based on the idea of shifting the ownership of loans to developing countries from commercial banks to a third entity. More than 25 Japanese banks have set up a company in the Cayman Islands to which they will sell some of their troubled loans to developing countries at a discount. A number of details have not yet been finalized. But while the mechanism offers Japanese banks the benefit of shifting problem debts off the banks' balance sheets and of some fiscal reductions resulting from the capital losses incurred in the transaction, it is not clear how the debt-factoring company will behave in future negotiations with debtor countries.

Debtor countries, too, have come up with alternative approaches, some of them more radical than others. One of these alternatives is the proposed use of "exit bonds",[187] which has been incorporated in the recent agreement in principle between Argentina and its bank committee concerning the rescheduling of debts amounting to $30 billion and the provision of $1.95 billion of new money. This agreement involves an attempt to try out the "menu approach" to debt rescheduling and the provision of new money (described above) under which banks and borrowers offer each other various alternative financing options. Argentina's proposal for "exit bonds" is based on the argument that the approximately one-third of the 360 banks participating in its last package, which account for just 1 per cent of total lending, should be given the option of ending their exposure through "exit bonds". They would thus be spared participation in the new package. For Argentina it would mean that delays in putting together financial packages caused by smaller banks' reluctance to participate, and the resulting damage to international financial confidence, would be avoided. This would be an exception to the principle that all creditor banks continue to contribute to new loans and rescheduling for troubled debtors. Another proposal, based on the concept of debt-for-equity swap, was put forward by the Government of the Philippines at the end of 1986, and included in its agreement in principle with its banking committee on debt rescheduling and the provision of new money in early 1987. Banks would be paid part of the interest due to them in notes convertible on advantageous terms into equity investment, instead of in cash.[188] One of the objectives of the mechanism

184 A study of some illustrative examples of hypothetical debt relief was undertaken at the request of Senator Bradley by the United States Federal Reserve System. The study finds that the examples examined would call for bank recognition of loss in the form of significant reductions in reported earnings in instances where debtors would receive little near-term benefit. Senator Bradley specified that under his plan banks would actually choose which debtors needed relief the most and which ones had done the most to deserve it. They would also choose how much relief, up to the maximum, would go to any debtor.

185 Letter from Paul Volcker, Chairman of the Board of Governors of the United States Federal Reserve System to Senator Bill Bradley, 5 November 1986.

186 It appears also that the final attitude of many bankers to such schemes will depend on the regulatory and tax concessions that accompany such schemes.

187 An exit bond is a long-term bond carrying a low interest rate, which would bestow on the purchaser the right of exemption from participation in further rescheduling and coordinated lending exercises. The exit bond in the Argentinian proposal would be at a discount to face value and could be traded on the secondary market.

188 These notes - Philippine Investment Notes (PINs) - would be dollar-denominated obligations. In the Government's proposal, they were actually to be paid only for the interest margin over LIBOR. Banks accepting PINs would have received a somewhat higher margin than those insisting on full interest payment in cash. Under the plan, they would be sold to transnational corporations or other direct investors needing Philippine pesos for equity investment in the country.

was to solve the disagreement between the Government and its creditors on the size of the margins to be applied in the country's forthcoming restructuring.

The perceived lack of a satisfactory approach to handling the debt problem has led some countries to have recourse to more drastic steps. Limits on debt-service payments have been implemented by a few debtor countries. Since 1985 Nigeria, Peru, Zaire and Zambia have announced limits on the amount of foreign exchange which they are prepared to allocate to debt service.[189] In some cases such limits are still in place. Other governments have indicated that they were seeking to tie debt-service payments to their country's economic performance by limiting it to a percentage of their gross domestic or gross national product, or have mentioned absolute limits to the debt-service payments which they would make in a specific year.[190]

Most striking among these initiatives has been that of Brazil, which in February 1987 unilaterally announced an indefinite suspension of its interest payments on foreign bank debt.[191] Since this decision was taken by a very large borrower which had been widely regarded as having recently achieved an impressive economic performance, it is of particular significance for banks, as well as for debt strategy in general.[192] In March 1987, Ecuador announced that it had stopped its debt payments for the rest of the year. The government specified that this move had been prompted by damage caused by the earthquakes of March 1987 and by losses of oil revenues.

C. Non-performing and doubtful loans in developed market-economy countries

As indicated in the *Trade and Development Report 1986*, many banks in the OECD area have serious concern as to the quality of their assets which are not limited to their loans to developing countries. The underlying problems described in last year's *Report* remain, and their consequences for at least some sectors of the economies of OECD countries have become more serious. For example, in the United States banks are still plagued by troubles in the agriculture and energy sectors. A record number of failures (145) was registered in 1986 for the fifth year in a row. There were 120 failures in 1985 and 79 in 1984 (and less than 10 in 1981).[193] The Federal Deposit Insurance Corporation placed 1,484 banks (about one out of 10 of the banks which it insures) on its list of troubled institutions, a figure one-third higher than a year before.[194] Texas banks, because of the oil price collapse and consequential sharp decline in real estate values, suffered the worst,

189 Peru set its ceiling at 10 per cent of export revenues and Nigeria at 30 per cent. Zaire's ceiling on the debt-service ratio was also fixed at 10 per cent. The President of Zambia announced that, after deducting from export earnings the foreign exchange required to service the State-owned copper mines and the national airline, as well as that needed to meet fuel and fertilizer imports, 10 per cent of the balance would be used to service the country's external debt.

190 In mid-1986, for instance, Brazil's Minister of Finance indicated as a negotiating target limiting annual service payments to 2.5 per cent of GDP. (*Financial Times*, 30 July 1986.) Costa Rica proposed, for its forthcoming debt restructuring, that its debt payments be tied to its economic performance so that principal and interest payments would represent 1.5 per cent of GNP. This has not been accepted by its creditor banks partly because, as in other cases, banks fear that such a clause would be claimed as a precedent by debtor countries with much higher debts than Costa Rica.

191 The moratorium is supposed to last until Brazil agrees on a new debt package with its creditor banks.

192 US bank regulators lowered Brazilian loan ratings, reclassifying Brazilian debt as "sub-standard". Some US banks also downgraded their loans to Brazil, placing them on a "non-accrual status"; income on the loans would thus be recorded only when cash payments come in. The usual practice is to wait until such funds are 90 days overdue before putting the loans on a non-accrual status. The banks' decision means they have chosen to take cuts in earnings from the beginning rather than letting potential losses accumulate; this may give them more leverage in the negotiations with Brazil. The Brazilian move also undoubtedly contributed to the decisions of two large United States banks to increase their loan loss reserves (mentioned in section A).

193 *The Economist*, 21 March 1987.

194 *Ibid.*

accounting for about one-fifth of the recorded bank failures.[195] In early 1987, the Farm Credit System was acknowledging current losses of about $1 billion a month, with the result that there were recommendations in some quarters for a federal take-over.[196] Other weaknesses in the economy have also affected banks in the United States. While a few banks made impressive profits in 1986, for the most part the performance of the major banks in this country continued to indicate a banking sector that is under pressure.[197]

The recent rapid expansion of debt increases the vulnerability of the United States economy to serious financial difficulties in the event of a recession. Since the beginning of the 1980s household and business debts have been rising significantly faster than GNP. Personal bankruptcies were already at record levels in the United States in the first six months of 1986. Moreover, the financing of leveraged buy-outs is another source of concern as the companies affected were typically left with high debt/equity ratios, and were thus especially vulnerable to an economic downturn.[198] Defaults on leveraged buy-outs in the first half of 1986 reached 2.7 per cent, compared with an average of 1.5 per cent a year in the preceding decade.[199] In the United Kingdom there has been a similarly rapid accumulation of debt in some sectors of the economy. For example, household debt increased from 40 per cent of disposable income in 1970 to 70 per cent in 1986. As in the United States, bankruptcies and insolvencies have been taking place at a high rate.[200]

The implications of such weaknesses in the positions of many banks and of the greatly increased debts of other sectors go beyond increased vulnerability to financial disorders in response to more unfavourable macroeconomic conditions. They also inhibit more radical approaches to developing countries' debt problems, which would involve the assumption by governments of part of the costs of the writing-down of these debts. It is argued that for political reasons governments would find it hard to restrict steps of this kind to developing countries' debts, and might then have to face the potentially very large cost of contributing to analogous operations covering banks' exposure to problem sectors within their own economies.

D. Other aspects of developing countries' trade financing

The financing of trade cannot be separated from external financing in general, since all types of financial flow, official as well as private, may be used for this purpose. Thus, its availability is affected by the recent behaviour (discussed above) of different types of financing from the international capital markets. However, the impact of this behaviour transcends declines in the amounts of available financing. Through its contribution to external financial stringency and thus to the worsening of many developing countries' capacity to meet their external obligations, it has also tended to raise many costs of, or disrupt in other ways, credit and closely related payments arrangements in their international trade.

195 *The Banker*, March 1987. The other states where banks suffered the largest losses are also in the so-called energy belt: Oklahoma, Wyoming, Montana and South Dakota.

196 For example, in April 1987, the General Accounting Office recommended a federal takeover of the Farm Credit System, with the creation of a Federal Control Board which would oversee a rescue costing "billions of dollars". (*Financial Times*, 8 April 1987). There are some signs of recovery for the United States farm sector (with exports expected to rise in 1987 for the first time after six years of decline), but for farm banks 1987 may be the worst year yet. (*Financial Times*, 13 May 1987).

197 See, for example, *The Banker*, March 1987. Though loan-loss provisions have more than quadrupled since 1980, reserves in 1986 covered a smaller share of non-performing assets than at that time. Non-performing assets represented almost 2 per cent of total assets in 1986, for the fourth year in a row. (*The Economist*, 21 March 1987).

198 Mergers and buy-outs rose to $88 billion in 1986, and estimates indicate a further 53 per cent increase for 1987 (*ibid.*).

199 *Ibid.*

200 The proportion of loans written off as uncollectable almost doubled between 1982 and 1985 for the four big clearing banks in the United Kingdom (*ibid.*, 21 March 1987).

Several of the costs of financing and payments arrangements are related to the risks of non-payment. Thus, when these risks are high, as has widely been the case since the outbreak of the debt crisis, the charges associated with such arrangements increase and their other terms become more stringent. This process can be observed both for arrangements covered by official insurance (export credits) and for those without official support. The features of export credits affected by the process include levels of insurance premia, the proportion of the credit for which insurance cover is available, the period after the occurrence of non-payment before insurance claims are met (the claims-waiting period), ceilings on the size of commitments, and the types of security required as a condition for the extension of cover. In the case of financing and payments arrangements not covered by official insurance, the effects of increased risks of non-payment are evident in features such as the premia and other conditions associated with private insurance, and the charges on letters of credit. Thus the rates of interest on export credits to developing countries under the OECD Consensus[201] (whose downward trend since 1984 is shown in table A5) are at most a partial guide to movements in the true costs of trade financing for countries experiencing debt-service difficulties. Moreover, they give no indication as to how restrictive are the terms on which such financing is available.

Data concerning insurance cover for export credits to developing countries from the Export Credit Guarantee Department of the United Kingdom and the Export-Import Bank of the United States indicate how widespread in early 1987 were surcharges over normal premium levels and other restrictive terms.[202] For a sample of African countries and territories cover on normal terms was not available from either agency in a single case. For the great majority it could be obtained only at above-normal costs, on other restrictive terms, or both. One of the agencies had suspended cover for 10 countries or territories, and the other for three. Likewise, the majority of the sample of countries and territories in Latin America and the Caribbean faced surcharges and restrictive terms. For this group one of the agencies had suspended cover in one instance, and the other in four, while normal cover was available from the agencies in three and four instances, respectively. For the sample of developing countries and territories in Asia and Oceania the position was somewhat more favourable. Here, too, the majority faced surcharges, restrictive conditions, or the non-availability of cover. However, normal cover was available in six instances from one agency and in eight from the other.

Insurance from private markets tended to be more expensive, and was often available only on more restrictive terms, than that from export credit agencies (ECAs) (although there were a few instances where insurance could be obtained only from private sources). The interaction of the high costs or non-availability of financing and payments arrangements for many developing countries' imports, on the one hand, and the depressed markets for their exports, on the other, helps to explain the continuation of widespread recourse amongst them to countertrade.

As in earlier years since the outbreak of the debt crisis, the terms and availability of export credits were subject to conflicting pressures. On the one hand claims continued to exceed the sum of premium income and recoveries for many ECAs, including those of most of the larger OECD countries. Indeed, losses on this account in 1985 for a group of 19 ECAs of countries in this group, while somewhat less than in 1984, still amounted to almost $2 billion.[203] Since ECAs must generally aim to be self-supporting on their commercial operations over the medium term, such results are a source of pressure for higher premia and more restrictive policies for their insurance on credits to troubled debtor countries. Yet ECAs are also concerned to protect as far as possible their past loans to these countries. Moreover, one of their major objectives is the promotion of exports.

ECAs have recently shown a willingness to pursue more flexible and selective policies with respect to insurance cover for troubled debtor countries. This willingness has been evident in, *inter alia*, their procedures both as regards the suspension of cover for countries which apply for the rescheduling of official

201 Concerning the OECD Consensus (whose full official title is the Arrangement on Guidelines for Officially Supported Export Credits) see *Trade and Development Report 1985* (United Nations publication, Sales No. E.85.II.D.16 and corrigendum), paras. 286-288.

202 *Euromoney Trade Finance Report*, issues of January, February and March 1987. The terms on which official insurance is available to some developing countries reflect factors which are not wholly, or not at all, of a commercial character.

203 D. Mills, "Agency results: now the agencies fight back", *Euromoney Trade Finance Report*, November 1986; and D. Bowen, D. Mills and M. Knight, *The Euromoney Guide to Export Finance* (London: Euromoney Publications, 1986), Part I.

Table A5

INTEREST RATES UNDER THE OECD ARRANGEMENT ON GUIDELINES FOR OFFICIALLY SUPPORTED EXPORT CREDITS

(Per cent)

Maturity	*As from:*							
	July 1982	*October 1983*	*January 1984*	*July 1984*	*January 1985*	*January 1986*	*July 1986*	*January 1987*
2 to 5 years								
Group I	12.15	12.15	12.15	13.35	12.00	10.95	9.55	9.55
Group II	10.85	10.35	10.35	11.55	10.70	9.65	8.25	8.25
Group III	10.00	9.50	9.50	10.70	9.85	8.80	7.40	7.40
5 to 8.5 years								
Group I	12.40	12.40	12.40	13.60	12.25	11.20	9.80	9.80
Group II	11.35	10.70	10.70	11.90	11.20	10.15	8.75	8.75
Group III	10.00	9.50	9.50	10.70	9.85	8.80	7.40	7.40
8.5 to 10 years [a]								
Group III	10.00	9.50	9.50	10.70	9.85	8.80	7.40	7.40

Source: OECD press releases and publications.

Note: Under the OECD Consensus Group I consists of relatively rich borrower countries, Group II of intermediate borrower countries, and Group III of relatively poor borrower countries.

a The maximum repayment periods for Groups I and II under the Arrangement (except for selected intermediate borrowers) are 8.5 years.

debt, and as regards the restoration of its availability after the completion of renegotiations. Thus, a recent survey of IMF[204] found that among a group of the ECAs of OECD countries there had been widespread modifications of their procedures with the aim of accelerating the restoration of insurance cover after reschedulings at the Paris Club. This, it was hoped, would lead to substantial reductions of the period of interruption for cover which, under previous practices, might be resumed for medium-term and long-term credits only after two to three years. The new procedures involved the precondition that the debtor countries concerned commit themselves not to seek changes in their cut-off dates[205] under their Paris Club agreements. Moreover the procedures generally led to the restoration of cover only on a selective basis. For example, cover might be resumed only for imports likely to contribute directly to the debtor country's economic recovery, and only up to some overall limit for new credits.

Another noteworthy development in connection with ECAs' practices with respect to reschedulings was associated with the exclusion in a number of instances of private sector export-credit debts from the renegotiations. Such exclusion is a response to widespread willingness among ECAs to continue cover for parties in debtor countries who choose to avoid rescheduling and continue to make debt-service payments on a current basis. Thus, in the case of a recent rescheduling for Chile, where the debts of the private sector were excluded from the agreement and its debt-service obligations continued to be met, most of the ECAs covered by the IMF survey continued to make available cover for credits to private-sector borrowers.

The greater flexibility of ECAs' policies as regards cover may have made some contribution to the revival of total export-credit lend-

204 E. Brau, K.B. Dillon, C. Puckahtikom and M. Xafa, *Export Credits Developments and Prospects*, IMF World Economic and Financial Surveys (Washington, D.C., July 1986), chap. III.

205 The cut-off date is the date before which debt must have been incurred, if it is to be eligible for rescheduling. Creditors are reluctant to accept changes in the cut-off date for subsequent reschedulings since they would entail the inclusion in the renegotiations of export credits granted since the initial rescheduling.

ing since 1984. However, the contribution is likely to have been limited. As noted earlier, new flows to developing countries in the form of medium-term and long-term export credits have continued to decline. Moreover, as shown in Annex table 15 total export credits tended to grow more slowly for countries which underwent reschedulings of official debt in 1982-1985 than for others. For most debtor countries a more vigorous recovery of borrowing in the form of export credits will probably have to await more radical steps to relieve their debt burden, such as the recent proposals of certain Paris Club countries to provide debt relief to selected low-income countries,[206] or a sustained improvement in their export prospects (or both).■

206 These proposals would involve three sorts of action: first, a significant lengthening of grace and repayment periods (the latter to between 15 and 20 years) for the poorest, heavily indebted countries; secondly, improvement of IMF's Compensatory Financing Facility to make it more concessional; and, thirdly, the creation of a new, exceptional, facility for development and debt reduction, preferably within the framework of the World Bank, with the objective of partially refinancing previously rescheduled official debts on highly concessional terms.

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Annex 5

RECENT DEVELOPMENTS IN INTERNATIONAL TRADE POLICIES

I. Introduction

For a number of years, international trading relations have been conducted against a background of discordant policies; protectionist measures have vied with actions to strengthen the open, multilateral trading system. But the trade conflicts which have dominated the international scene over the last year or two cannot be so simply characterized. This is because of the particular circumstances which have given rise to the conflicts. The long-familiar sources of trade tensions are the protectionist pressures generated by such factors as high levels of industrial unemployment, resistance from declining industries to structural change, or the protection of real incomes in high-cost agriculture; and those pressures continue to be everywhere present. Recent trade conflicts, however, do not have their basis only on such familiar pressures; they have also been fanned by a new element, namely the substantial trade imbalance of the United States that has arisen since the relatively rapid growth of its economy and the sharp appreciation of the dollar that took place from 1982 to 1984. Against a background of slowing economic growth in the trading partners of the United States, subsequent dollar depreciation has not - at least until very recently - significantly modified the adverse trends in merchandise imports and exports, and the political demands for more direct trade measures have accordingly mounted. These demands have been particularly strong in regard to trade with countries which have accumulated large trade surpluses with the United States, most notably Japan. Pressures have also been exerted on developing countries or areas which maintain large trade surpluses with the United States, and which allegedly restrain imports, such as Taiwan Province of China and the Republic of Korea, who are being strongly pressed to open up markets and to allow their currencies to rise against the dollar.[207] Relations with Japan have also been complicated by the competition for technological leadership in new industries and by the United States concern that policies relating to such matters as government procurement and market access may not be evenly balanced.

The macroeconomic circumstances which have done much to generate recent trade conflicts have also imparted certain distinctive features to them. The intent of actions taken by the United States Administration has not only been to protect domestic industries from foreign competition in the domestic market but also, and principally, to gain easier access for exports to the country's main trading partners. It may, of course, sometimes be a legitimate matter of dispute whether the case for greater

207 The United States has exercised pressure on these countries in various ways, such as (threats of) retaliatory actions under section 301 of the Trade Act of 1974, graduation from GSP benefits and lower growth rates in bilateral textile trade agreements. (Textile agreements with the Republic of Korea and Taiwan Province of China, allow for an annual growth rate in exports of only 0.8 per cent and 0.5 per cent respectively over four years which are lower than growth rates provided for in agreements with other exporters).

access is valid. While, for example, the United States has sought access in Brazil for its computers and computer software, Brazil has maintained that it is exercising its right to protect an infant industry. It is often clear, however, that the letter or spirit of GATT is being violated by obstacles to non-discriminatory trade that are incorporated in domestic laws or regulations or in business or administrative practices. Some such obstacles - such as valuation or dumping practices - may be fully covered by the rules of the General Agreement, while others may not. Whatever the case, however, recent trade conflicts have generally not been handled through the GATT dispute settlement mechanism, but rather through bilateral negotiations, or else they have led to unilateral punitive action.

The failure to work within established rules and disciplines is a source of international concern. It risks the spread of unilateral action by governments, thus introducing an arbitrariness into international trade measures that is damaging to the stable and predictable international environment necessary for the growth of trade and trade-related investment. Unilateral or bilateral solutions to trade conflicts, moreover, are likely to ignore the multilateral character of trade and to have unintended, adverse repercussions. The recent United States action, for instance, in raising tariffs on imports from Japan of a range of electronic goods as a counter-measure to alleged dumping of semiconductors, has had both of these consequences. It elicited fears that it might presage a world of retaliatory, beggar-my-neighbour actions; and it provoked the European Economic Community in to warning that the tariff increase could cause the diversion of trade to its member countries, causing it to take defensive action. The Textile Bill before the United States Congress, which has been condemned by exporting countries as not being consistent with GATT, the Multi-Fibre Arrangement and the bilateral textile agreements with the United States has provoked a similar warning from EEC.

Failure to take account of the multilateral nature of international trade also characterizes many of the other trade bills presently before the United States Congress. Since the House of Representatives trade Bill would require countries which run large current account surpluses with the United States (based on alleged restrictive trade policies or unfair trade practices) to reduce their surpluses or suffer trade penalties, it challenges the whole system of multilateral settlement of trade balances, a cornerstone of the international trade and payments system as it functions today. It could give rise to a great deal of trade diversion, defensive counter-actions and consequent trade distortion.

While the large trade deficit of the United States has proved a new source of trade tensions, these tensions should gradually diminish as the macroeconomic policies of the United States and its trading partners reduce trade imbalances. There is the danger, however, that current efforts to reduce the deficit through trade measures may unintentionally bring about a deterioration in international trading relations. An improvement in the United States trade balance might then take place in a world of declining total trade, an outcome not in the interest of any country. However, the recent achievement of agreement among the developed market-economy countries to reduce price supports and cut subsidies in agriculture demonstrates that a more constructive approach to trade conflicts remains fully practicable. The Uruguay Round of multilateral trade negotiations offers the opportunity to extend the approach to other contentious areas.

II. Pressures for protectionist legislation

Proposed changes in trade legislation in some developed market-economy countries are creating tension because of concerns of trading partners that they contain provisions aimed at further restricting trade. In spite of the stance of the United States Administration against protectionist legislation, several trade bills have been proposed to the Congress. They reflect concerns about the continuous deterioration of the trade deficit, as well as the feeling in the Congress that it must take a tougher stance on foreign "unfair" trade practices, while promoting greater competitivity of United States export products. Some of these proposed bills are comprehensive and cover almost all aspects of international trade, while others are aimed at

specific sectors, such as textiles, footwear, sugar and coffee.

The "Trade and International Economic Policy Reform Act of 1987" and the "Omnibus Trade Act of 1987", which are similar to the Bill that passed the House of Representatives in 1986 but finally was not adopted, are before the House of Representatives and the Senate, respectively, and contain provisions which, if approved, would give rise to trade conflicts. These include, among others, a private right of action to permit United States manufacturers, producers or wholesalers to sue for "economic damages" resulting from dumping actions; complex modifications of the anti-dumping and countervailing duty laws rendering it easier for domestic industries to obtain relief; the broadening of the definition of "unfair trade" for purposes of retaliatory action against countries found guilty of "unfair trade" practices so as to include denial of workers' rights; and the proposal to require foreign countries to reduce "excessive trade surpluses" according to a fixed time schedule in order to avoid retaliation.

This last proposal, known as the Gephardt amendment, was adopted by the House of Representatives on 29 April 1987, at a time when the tension between the United States and Japan reached its most critical point since World War II, because of the imposition of retaliatory tariffs on a number of Japanese electronic products and electrical machine tools, - such as lap and desk-top computers, colour television receivers, and electric drills, hammers and grinders - following allegations that Japan was not fulfilling its commitments under the agreement on semi-conductors reached in July 1986. Under the proposed amendment, the Administration would be required to negotiate to put an end to "unjustifiable, unreasonable or discriminatory trade practices" in countries with exports to the United States exceeding imports therefrom by more than 75 per cent, provided that trade between the two countries is at least $7 billion. If no agreement is reached, the President would be required to reduce imports from those countries by 10 per cent each year until 1992, through negotiation or the imposition of unilateral quotas or tariffs. Although the objective of this proposal is to reduce trade imbalances mainly with Japan, other major trading partners would be targeted by the numerical criteria, including Brazil, the Republic of Korea, Hong Kong, Taiwan Province of China, the Federal Republic of Germany and Italy. Some of these countries have condemned the amendment as being contrary to free trade and inconsistent with GATT, and have warned against the potential for giving rise to more trade conflicts. The Administration for its part, has expressed dissatisfaction with this proposal and the President, who has pledged to "resist firmly protectionist pressures", has expressed his intention to veto any law calling for mandatory retaliation. The comprehensive trade bill was also adopted by the House of Representatives at almost the same time as the Gephardt amendment.

Of particular concern to developing countries is the "Textile and Apparel Act of 1987", introduced into the Congress in February 1987, similar to the bill vetoed by the President in 1986. The Bill includes provisions to impose global quotas on imports of textiles and non-rubber footwear, and 1 per cent growth rates for the next 10 years, with 1986 imports as the base year. Compensation to exporting countries, when required by international obligations, would only be in the form of tariff reductions of up to 10 per cent, phased over five equal annual stages. No tariff reductions on textiles other than those contemplated under the Bill would be negotiated. In addition the proposal contains provision for the spacing of imports in each year.

Of course, developing countries suppliers of textiles and clothing, which once more are threatened with protectionist legislation in this sector, have expressed concern, alleging that the real intention of the proposed Act is to freeze, and to eventually roll back, the present level of imports by circumventing the normal domestic procedures for import relief under section 201 of the Trade Act of 1974. They point to the inconsistencies of the bill with GATT article XIX and with provisions of the MFA and of the various bilateral textile agreements between the United States and its trading partners. They also contest the validity of any compensation of the kind proposed in the bill and the suggestion for mandatory spacing of imports for each year which would result in new non-tariff barriers. EEC has also reacted to the proposed legislation, warning the United States Government that "the European Community would be obliged to adapt its own textile policy to avoid the diversion of trade and to take retaliatory measures against American products".[208] It should be noted that EEC and the United States do not maintain mutual restrictions in textile trade, the MFA being aimed at restricting imports from the so-called low-wage developing countries and socialist countries, through an instrument which constituted a permanent waiver from GATT. Their mutual

208 *European Report*, 13 March 1987.

textile trade has been maintained at high levels for the last 25 years of operation of the textile arrangements. The inclusion of EEC and Canada in the scope of the textile bill was mainly for internal political reasons, in order to avoid criticism from the United States Administration.

Another proposed change in legislation that is likely to provoke vigorous reaction is EEC's projected extension of anti-dumping legislation to components of assembled dumped products. This move is intended to prevent foreign firms from circumventing anti-dumping penalties by setting-up assembly plants within EEC, so that the finished product can be assembled with cheap imported parts once an anti-dumping investigation on imports of the final product has begun. Japanese industry, which would be the hardest hit by the measure, has protested against the proposal and threatened to slow down or even reverse investment plans in the Community. Other countries, in particular, Asian exporters of manufactures would be affected by this measure.

III. Action against "unfair trade practices"

In some instances, practices provided for under existing legislation have been applied for the first time or have been used more frequently. For the first time since the Trade and Tariff Act of 1984 was enacted, an investigation was carried out under its section 307, which authorizes the United States Trade Representative (USTR) to seek reduction or elimination of export performance requirements which adversely affect the country's economic interest. The investigation involved export performance requirements for foreign investment in Taiwan Province of China, which is reported to have agreed to lift such requirements for foreign automobiles manufacturers by mid-1987.

Several investigations were conducted by USTR, under section 301 of the Trade and Tariff Act, which authorizes the President to retaliate against foreign "unfair practices" which harm United States interests. In September 1985, the President ordered USTR to initiate investigations involving informatic policies in Brazil, insurance policies in the Republic of Korea and tobacco and cigarettes in Japan. The inclusion of services followed the corresponding 1984 amendments of section 301. The self-initiation of these investigations constituted an important policy change.[209] Retaliatory action or threat thereof under section 301 has been often used as a means to obtain changes in trade policies and improved market access for foreign products. Among developing countries, some newly industrializing countries were subject to this kind of pressure, in particular the Republic of Korea and Brazil, as well as Taiwan Province of China. The retaliatory measures were exerted to obtain agreements with the Republic of Korea on intellectual property rights and insurance and to open up the market for imports of cigarettes. The Republic of Korea also liberalized imports and reduced tariffs on a number of products, including passenger cars, personal computers and other manufactured and farm products. The ban on imports of certain types of cars was lifted, partly to avoid pressures for voluntary restraints on exports to the United States. Taiwan Province of China has been under threat of retaliation because of what the United States feels is a failure in implementing an earlier agreement on customs valuation. After strong representations from the United States, it agreed to lift long-standing restraints on imports of tobacco, wine and beer. Import licences and tariffs were also eased on a large number of products, including textiles. Together with the decision to impose retaliatory tariffs on certain Japanese imports following the dispute on semi-conductors, the United States Administration decided to request Japan to open up its supercomputer market or face the self-initiation of action under section 301. It complained about the lack of transparency of government supercomputer procurement programmes and the discounting of prices by Japanese manufacturers. A special code on procurement of supercomputers (which are not covered by the broader GATT Code on Government Procurement) may emerge, which would help to avert retaliatory measures.

[209] The increase of section 301 actions followed the implementation of the Trade Action Plan, announced in September 1985. Under this plan a "Trade Strike Force" was created to counter allegedly unfair trade practices.

A major trade conflict involving a developing country is the one between the United States and Brazil on the latter's Informatics Law, adopted with a view to promoting a domestic informatics industry. Under this law, Brazilian producers are protected from foreign competition by means of an eight-year prohibition of imports of mini- and micro-computers, as well as of any product incorporating micro-processors, when national firms are not able to produce them. The law also authorizes a ban on the production of goods by foreign companies when domestic manufacturers can supply a viable alternative.

While Brazil considers that it has the sovereign right to protect its domestic infant industry, a section 301 action was engaged in response to what the United States regarded as an "unfair trade practice", accompanied by a threat of retaliatory action if bilateral negotiations failed to ease access of United States products to the Brazilian market. The conflict was extended to software, for which the United States wanted adequate protection for intellectual property rights. The threat of retaliation was extended to a wide range of products and included curbs on imports or increased tariffs on footwear, orange juice, coffee, steel and ethanol. Non-trade measures have also been mentioned as weighing in on the discussions, such as "influencing" IMF on talks with Brazil, and limiting visas to Brazilian travellers to the United States. The Government of Brazil reacted strongly, introducing a bill in the Congress calling for severe restrictions on foreign companies whose countries adopted policies hindering the exports of Brazilian goods and services, including a threat to curb the repatriation of profits. The retaliatory action, to be taken by the United States before 31 December 1986, was postponed for six months following certain concessions by Brazil, which included the streamlining of SEI (Secretaria Especial de Informatica), the agency administering the informatics law, a reduction of the list of products requiring SEI approval before obtaining an import licence and the creation of an *ad hoc* group of United States and Brazilian officials that would meet with industry on informatics issues.

The United States Administration also initiated for the first time a section 305 investigation, to gather information on the potential barrier to meat exports to EEC, proposed by the Third Country Meat Directive of the Economic Communities.

IV. Protection in agricultural trade

Whereas significant progress has been made over the past three decades in reducing tariffs affecting manufactured goods exported to industrial markets, little or no liberalization has occurred in agricultural trade. All developed market-economy countries continue to protect their agricultural sectors against competitive imports through domestic production support programmes and trade measures. Because of their large market size, the agricultural trade policies of EEC, the United States and Japan have a particularly important influence on world market conditions and prices for a large number of agricultural products. Other industrial countries employ similar agricultural policies. In contrast, in most developing countries, the overall stance of domestic agricultural and trade policies is one of negative support and protection for agriculture.

The agricultural production support and trade policies of the industrialized countries have not only restricted the access of foreign suppliers, including developing countries, to their markets, but have also generated large surpluses of such products as sugar, meat, cereals and dairy products. In response to such surplus production, and in particular in order to reduce mounting storage costs and to prevent spoilage and wastage, two types of action have been taken. One approach has been to sell surplus agricultural products on the world market at subsidized prices. The other has been to encourage expanded domestic processing of the products concerned, including through the sale of surplus stocks to domestic processors at prices below domestic market prices with special credits, market promotion assistance and the escalation of trade barriers with stage of processing. These actions, while reducing the opportunities for trade expansion in raw and processed agricultural products, in particular for developing countries, have also led to persistent misalignment of demand and supply, as well as to increased price instability on world markets for the affected products.

The costs of such policies to the countries imposing them are quite large. For example, over the past few years, the United States, EEC and Japan have together spent approximately $47 billion annually on their agricultural support programmes, including subsidies for exports. Such programmes have clearly exerted a downward pressure on prices for commodity exports from developing countries.

After the so-called pasta war, a long-standing conflict over access of citrus fruit into EEC from the United States which degenerated into a series of retaliatory and counter-retaliatory increases in tariffs, another major trade dispute threatened to break out between EEC and the United States as the latter claimed full compensation for its farmers for agricultural trade losses in the Spanish market resulting from the tariff adjustment required for the phasing-in of Spain into the CAP. In both cases a solution was reached, after threats of retaliation and counter-retaliation, in the form of tariff concessions on citrus fruit and other agricultural productss in the first case and guaranteed access at reduced levies for United States feed grains, plus reduced duties and additional access for other agricultural and industrial products in the second. However the fundamental problem of agricultural surpluses and subsidies remained unresolved and the struggle for market shares was intensified.

There has been a growing perception in OECD of the need to reduce assistance to the agricultural sector and to shift the emphasis away from production support to direct income support. This is a result of the high budgetary costs of assistance[210] and the perception that excess stocks can no longer find an outlet in world markets, thus constituting an ever-increasing source of tension in international trade. It is encouraging to note that the OECD Ministerial meeting in May 1987, "called on its industrial-country members to adopt reforms aimed at reducing the costs and economic distortions arising from presents methods of supporting farm incomes". The long-term objective would be the gradual reduction of assistance and protection on a multilateral and multicommodity basis. Market signals would be allowed to play a greater role in the orientation of agricultural production, which should be accompanied by a reduction of tariff and non-tariff barriers through which countries have insulated their domestic markets from international markets. In the domestic markets this would result in decreased production and stocks, lower prices and increased consumption, as well as reduced budgetary costs. In international markets it would result in higher prices (especially for food; the price of animal feeding stuffs might fall in certain cases due to reduced feed demand) and greater price stability. Although some developing countries which are net importers of food items might suffer from higher import prices in the short run (effects which could be mitigated by co-ordinated international action), higher and more stable prices would give incentives to agricultural development in the third world.

V. Assessment of trade intervention measures

Research by the UNCTAD secretariat on the basis of its Data Base on Trade Measures shows that in recent years, most of the new trade interventions by developed market-economy countries, consisting mainly of restrictions and retaliatory actions were directed primarily against other such countries.[211] This was due particularly to the complex system of trade measures built up against Japanese exports, especially in EEC and to a lesser extent in the United States. No less than 50 per cent of the (1981) trade coverage of increased intervention through non-tariff measures in the period 1981-1986 was directed against Japan. Increased trade intervention against developing countries was almost entirely due to actions directed against relatively more advanced developing countries, both in Asia (principally the Republic of Korea) and in Latin America (principally Brazil).

210 The decline of the value of the dollar has significantly increased costs of agricultural assistance in other countries, notably those of EEC.

211 Increases in trade intervention since the commitments on "standstill" and "roll back" have been concentrated in the United States and EEC, whereas other countries, such as Japan, Norway and New Zealand, eased import restrictions. The problem with "standstill" and "roll back" commitments is obviously that the extent of trade intervention before these commitments varied very widely from country to country.

VI. Conclusions

It is obvious that trade restrictions and retaliations not only have a direct impact on the national economies concerned, but also are prejudicial to the longer-term growth prospects of all countries. Subsidies and new forms of barriers, such as voluntary export restraints, have reduced competition in the sectors affected, constrained employment creation in other sectors, and discouraged efficient industries. These restrictions have thus had spill-over effects on third countries, including developing countries, in terms of unused capacity and uncertainties as to market growth and investment prospects.

The elimination of such restrictions should be a common task for the the international community, together with the correction of internal and external financial and trade imbalance. The continuation of attempts at resolving trade tensions through bilateral channels with threats and retaliations would only exacerbate the situation, erode the credibility of the international trading system and reduce prospects for sustained investment and growth. It is therefore imperative that trade conflicts and disputes be resolved in an orderly fashion, with increased transparency in accordance with agreed multilateral principles and rules. This calls for a commitment by States to utilize fully the process of liberalization envisaged in the Uruguay Round.■

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Annex 6

IMPORT COMPRESSION, INVESTMENT AND GROWTH IN DEVELOPING COUNTRIES

As has been noted in Part One, chapter I, the world economy appears balanced on the edge of a new and possibly prolonged recession. The pressure on developing countries to adjust to reduced foreign-exchange availabilities remains undiminished and is likely to be intensified if world demand further weakens. In the past, developing countries as a group have reacted with a range of measures, including export promotion drives, import substitution programmes and austerity. The mix of policy measures taken by any particular country has depended to a great extent on the structure of its economy, which in turn is related to its level of development. In addition, the choice of export promotion or import compression is often dictated by the degree of immediacy of the external constraints on import capacity. Recent developments in the world economy would appear to be skewing policy responses in the direction of continued, or even intensified, import compression in two respects: export drives are meeting with increased resistance in major importing countries, while the combination of high-debt burdens and constricted flows of new finance are shortening the perceived time-frame within which countries need to redress external imbalances.

This annex examines two issues relating to a postulated international environment in which developing economies are unable to improve export earnings or capital flows sufficiently to avert the need to follow policies to compress imports below "normal" or "desired" levels. The first is the source and nature of certain major constraining factors influencing the preferred policy options of individual countries and their effects (which are measured by means of simulation analysis). The second is the impact on world trade of a generalized compression of imports by developing countries and the relative importance of the "fallacy of composition". To this end the annex first focuses on a brief taxonomy of structural factors which significantly influence the constraints affecting policy freedom. It then presents a heuristic long-term growth model designed to measure the effect on growth under varying assumptions of selected strategies involving consumption, investment and import policies adopted in response to an externally induced reduction in import capacity. Finally, UNCTAD's System for Interlinked Global Modelling and Analysis (SIGMA) is deployed to ascertain the global implications of import compression efforts by developing countries.

I. Structural factors influencing the available range of domestic policy actions

In Box A4 (Part I) a model is presented which is intended as a heuristic device to explore policy alternatives relating to consumption, investment and imports under different assumptions regarding structural characteristics of the economy. Crucial to the behaviour of the model are parameters representing the degree of openness of the economy, the extent of dependence on food (or other consumption) imports, the elasticity of output with respect to

Box A4 (Part I)

SIGMA - MODEL SPECIFICATION [1]

(01)	Y_{cap}	=	$A \times K^{a} \times LF^{(1-a-b)} \times (M_{rm})^{b}$	
(02)	$M_f{}^{d}$	=	$m_f \times C$	
(03)	$M_{rm}{}^{d}$	=	$m_{rm} \times Y_{cap}$	
(04)	$M_k{}^{d}$	=	$m_k \times S_p$	
(05)	$M_g{}^{d}$	=	$M_f{}^{d} + M_{rm}{}^{d} + M_k{}^{d}$	
(06)	PM	=	$(PM_f \times M_f + PM_{rm} \times M_{rm} + PM_k \times M_k)/M_g$	
(07)	$M_{nfs}{}^{*}$	=	$m_{nfs} \times PM \times M_g$	
(08)	M^{d*}	=	$M_{nfs}{}^{*} + PM \times M_g{}^{d}$	
(09)	$M_{gap}{}^{*}$	=	$M^{d*} - M_{cap}{}^{*}$	
(10)	$M_{cap}{}^{*}$	=	exogenous	
(11)	M_f	=	$M_f{}^{d} - r_f \times M_{gap}/PM_f$	
(12)	M_{rm}	=	$M_{rm}{}^{d} - r_{rm} \times M_{gap}{}^{*}/PM_{rm}$	
(13)	M_k	=	$M_k{}^{d} - r_k \times M_{gap}{}^{*}/PM_k$	
(14)	M_g	=	$M_f + M_{rm} + M_k$	
(15)	M	=	$M_g + M_{nfs}{}^{*}/PM$	
(16)	C	=	f(Y/N,DEP)	
(17)	X	=	exogenous	
(18)	S_p	=	$Y_{cap} - C + M - X$	
(19a)	I	=	S_p	iff $M^{d} = M$
(19b)	I	=	$S_p - S_p \times (1 - M_k/M_k{}^{d})^{sig}$	iff $M^{d} > M$
(20)	Y	=	$C + I + X - M$	

1 Lower-case letters refer to parameters, while upper-case letters refer to variables. Variables expressed in nominal terms are indicated by a '*' superscript.

capital and to intermediate imports, and the degree of substitutability between domestically produced and imported capital goods. While highly simplified, this structure may be used to describe the broad constraints on the policy formation process experienced by developing countries. In turn, these aggregative parameters reflect, and are determined, by a large number of factors relating to the structure of the domestic economy and its situation in the international economic environment. It follows that indicated policy response packages to ex-

Box A4 (Part II)

SIGMA - DEFINITION OF VARIABLES

Y_{cap}	=	full capacity GDP
Y	=	*ex post* GDP
M^d	=	demand for imports of goods and non-factor services
$M_f{}^d$	=	demand for imports of food
$M_{rm}{}^d$	=	demand for imports of intermediate goods
$M_k{}^d$	=	demand for imports of capital goods
M	=	*ex post* imports of goods and non-factor services
M_f	=	*ex post* imports of goods
M_{rm}	=	*ex post* imports of intermediate goods
M_k	=	*ex post* imports of capital goods
M_{cap}	=	import capacity (export revenues plus net capital flows)
M_{gap}	=	difference between demand for imports and import capacity
X	=	exports of goods and non-factor services
I	=	*ex post* investment
S_p	=	potential investible resources
DEP	=	ratio of dependent population to total population

DEFINITION OF PARAMETERS

A	=	scale factor in production function
a	=	elasticity of output relative to capital
b	=	elasticity of output relative to intermediate imports
m_f	=	propensity to import food in relation to private consumption
m_{rm}	=	propensity to import intermediate goods in relation to GDP
m_k	=	propensity to import capital goods in relation to GDP
m_{nfs}	=	imports of non-factor services as a proportion of imports of goods
r_f	=	proportion of import gap assigned to imports of food
r_{rm}	=	proportion of import gap assigned to imports of intermediate goods
r_k	=	proportion of import gap assigned to imports of capital goods
sig	=	a measure of the elasticity of substitution between domestically produced investment goods and imported capital goods.

Box A4 (Part III)

SIGMA - ESTIMATED EQUATIONS [1]

Production function

$$\ln (Y_{cap}/LF) = \underset{(20.02)}{4.60} + \underset{(14.35)}{0.43} \ln (K/LF) \qquad (R^2 = 0.86)$$

$$\text{Residual} = \underset{(-9.78)}{-4.63} + \underset{(9.81)}{0.23} \ln (M_{rm}/LF) \qquad (R^2 = 0.35)$$

Consumption function (private)

$$C_p/(Y+M-X) = \underset{(5.6)}{0.32} + \underset{(2.4)}{0.39 \times 10^{-5}} (Y/N) + \underset{(5.5)}{0.69}\ DEP \qquad (R^2 = 0.89)$$

Consumption function (public)

$$C_g/(Y+M-X) = \underset{(-3.0)}{-0.09} + 0.91 \times 10^{-9} (Y/N)^2 + \underset{(7.3)}{0.46}\ DEP \qquad (R^2 = 0.86)$$

1 Region-specific dummy variables are excluded.

ternal disruption[212] are highly unique, with respect both to the particular economy and to the circumstances involved. Nevertheless, some general observations regarding broad relationships between economic structure and the range of feasible policies can be made.

Among the most important characteristics of an economy influencing its response to disruption is its degree of openness, generally measured by the ratio of trade turnover (exports plus imports) to gross domestic product. It not only influences the direct impact on the domestic economy of fluctuations in import capacity but also bears on the characteristics of the internal structure itself. In general, there is an inverse correlation between the size of the economy and the degree of openness.[213] By the same token, the degree of articulation of the manufacturing sector, and the size of the domestic capital goods sector in particular, is closely related to the size of the domestic economy and to the stage of development. A relatively large economy with a well-developed manufacturing base and a significant capacity to produce capital goods can reduce imports of investment goods with much less damage to domestic productivity than can economies with fewer such resources, assuming that it is able to improve domestic savings performance.

At the same time, the relative size of the manufacturing sector is also closely related to the level of per capita income. Thus, to some extent, there is a degree of substitutability between absolute economic size, on the one hand, and the level of development, as measured by per capita output, on the other. However,

212 In the discussion that follows, the term "disruption" is limited to cases where changes in the international environment result in an undesired reduction in the rate of growth of import capacity of an economy. Policies appropriate to deal with a disruption to import capacity will depend upon the expected duration of the disruption as well as on whether it originates from movements in international prices, export volumes, factor payments or changes in the availability of external capital.

213 This stems from the fact that, other things being equal, economies of scale tend to favour firms with direct access to relatively large markets.

there are limits to the size of an economy below which it can successfully convert an increased savings effort into increased investment rates without recourse to the external sector. In contrast, large economies as a rule will tend to be less affected by disruptions of the international environment than smaller ones and, at the same time, will have greater domestic resources to bring to bear on the adjustment process.

The above observations indicate why developing countries, except the very largest, rely heavily on international trade and finance to translate successfully *ex ante* savings into domestic investment. As a consequence, the traditional policy response of developing countries to externally induced disruptions has been to pursue export promotion and/or to seek compensatory international finance. The structurally imposed costs associated with the compression of productive imports clearly make this a second-best policy option in the majority of cases. However, in the past five years developing countries as a group have managed to increase imports significantly in only one year and have actually reduced imports in each of the other years. Thus, there is reason to believe that many, if not most, developing countries have by now eliminated all but the most essential imports and that current import compression is affecting imports that are vital to their economy and its longer-term growth and development.

II. Consumption, investment and import policy under conditions of import compression

An economy faced with framing policy responses to externally induced disruptions where there are limited possibilities for export expansion or increased net capital inflows still has a number of decisions to make regarding consumption, investment and imports. Further, the medium-term costs of an immediate necessity to reduce imports by a given amount differ significantly, depending both on the policy mix adopted and on the structural characteristics of the economy. The model contained in Box A4 (Part I) has been designed to provide a broad measure of these costs, under different assumptions regarding policies and structural parameters, by identifying the main channels by which an externally induced disruption to import capacity is transmitted to the domestic economy and results in reduced growth performance. It consists of a production function containing as arguments capital, labour and intermediate imports, import demand equations for food, intermediate goods and investment goods; consumption functions, including as arguments per capita income and demographic dependency ratios; and a function describing the response of domestic investment to a constricted supply of imported investment goods. In addition, there is a set of policy response parameters controlling the nature of import compression resulting from reductions in import capacity. For the purposes of this exercise, the model has been fitted to the Latin American Eurocurrency borrowers as a whole[214] and parameters are generally based on the more recent experience of this region.

Taken together, the specified equations reflect the fact that, in addition to the direct reduction in investible resources, a reduction in imports will immediately reduce production levels to the extent that intermediate goods imports have been reduced. If it is capital goods imports that have been reduced, the reduced rate of growth will be a consequence of the slower growth of the capital stock. In so far as there is a degree of complementarity between domestic and imported capital goods, the impact on capital accumulation will be more than the decrease in imported capital goods. In addition, the concomitant reduction in domestic investment will also result in underutilization of capacity. Given the current views concerning the longer-term perspective for the world economy, but assuming no externally imposed constraints on import capacity, the model generates a growth rate for the period 1985-2000 of about 4.4 per cent per annum (see chart A-VI).[215] This should not be taken as a fore-

214 Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.

215 Assumptions concerning export demand and international prices are taken from the base-line scenario presented in chapter II of the report by the UNCTAD secretariat, *Revitalizing Development, Growth and International Trade: Assessment and Policy Options* (TD 328 Rev.1).

cast, *per se*, since the parameters built into the model are based on sometimes unstable historical relationships. For example, no account is taken of the possibilities for productivity growth, as the estimated parameters for the countries covered showed no positive growth over the estimation period. However, the growth path generated may be interpreted as a benchmark against which to measure the potential importance of various parametric changes to the system.

As a first step, a scenario was constructed where an undifferentiated policy of import compression was adopted. As opposed to the unconstrained scenario above, where import demand expanded at an annual average of 8.1 per cent in nominal terms, it was assumed that import capacity, defined as export revenues plus net capital flows adjusted for reserve changes, grew by 5.6 per cent per annum, i.e. 2.5 percentage points less than unconstrained import demand. In the spirit of an undifferentiated policy response, the required reduction in imports was distributed equally among all categories of imports. Assuming a strict complementarity between domestically produced and imported capital goods, the resultant growth rate of output would be about 2.6 per cent for the period as a whole, as compared to 4.4 per cent when imports are not constrained. Reflecting the inability to fully realize the requisite savings effort, underutilization[216] of capacity would increase to about 5.5 per cent by the end of the period.[217]

When an economy is faced with the necessity of adjusting to an external shock, priority is often placed on the reduction of capital goods imports, particularly if the payments difficulties are perceived to be temporary, since a reduction in imports of intermediate goods would be expected to have an immediate impact on output. Chart A-VII presents two variants of the compression scenario described above, one where only capital goods imports are reduced and one where only intermediate goods imports are reduced. As can be seen, the negative effect of compressing capital goods imports is much more severe than for intermediate goods. However, much depends on the degree to which the imported capital goods are necessary complements to gross domestic investment, on the one hand, and on the elasticity of output relative to intermediate goods imports, on the other.[218]

As an illustrative exercise, two additional simulations equivalent to those presented in chart A-VII were carried out on the assumption of a high degree of substitutability between domestically produced and imported capital goods (see chart VIII). As might be expected, on this assumption the outcome is reversed: with a high degree of substitutability the preferred strategy is to compress imports of capital goods rather than intermediate goods.

Increasing the savings rate is another means of preserving growth in the face of import compression. The efficacy of such efforts, however, depends upon the ability to transform savings into domestic investment and is influenced by the relative importance of consumption goods in the total import bill. Chart A-IX presents two alternative versions of the initial constrained scenario, but with public and private consumption levels reduced by 5 per cent. Where there is complementarity between domestic and imported capital goods the increase in *ex ante* savings effort has virtually no effect on growth. Since, by definition the domestic component of investment is not productive in the absence of imported capital goods, the increased saving effort cannot be transformed into productive investment in the absence of increased imports. On the other hand, with the possibility of transforming savings into investment, increased growth does occur.

It is clear from the above exercises that the ability of an economy to support a viable domestic capital goods sector is of central importance in determining the extent to which it can maintain growth rates in the face of an externally induced reduction in import capacity. In turn, it must be emphasized that only relatively large economies, with a fairly well-developed manufacturing sector, have the ability to maintain an efficient domestic capital goods sector.[219] For the most part, the developing countries depend upon the external sector to transform savings into investment, and hence a compression of imports leads inexorably to reduced growth.

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216 The model specification leaves the relative proportion of capital and labour unemployed as indeterminate.

217 This is probably understated, given the implicit high rate of depreciation built into the model.

218 See equations (01) and (19b) in Box A4 (Part I) for the relevant relationships.

219 For developing countries as a whole, the ratio of imports of capital goods (SITC 7) to domestic investment is negatively related both to per capita GDP and to the relative size of the manufacturing sector.

$$\frac{M_k}{I} = \underset{(10.7)}{1.19} - \underset{(-4.2)}{0.07}\ \ln(Y/N) - \underset{(-5.0)}{1.30}\ \text{Mfg } Y + \underset{(3.6)}{0.017}\ (t\text{-}1980) \qquad (R^2 = 0.37)$$

where numbers in brackets are T-values.

Chart A-VI

GROWTH OF GROSS DOMESTIC PRODUCT:
CONSTRAINED VERSUS UNCONSTRAINED IMPORT DEMAND

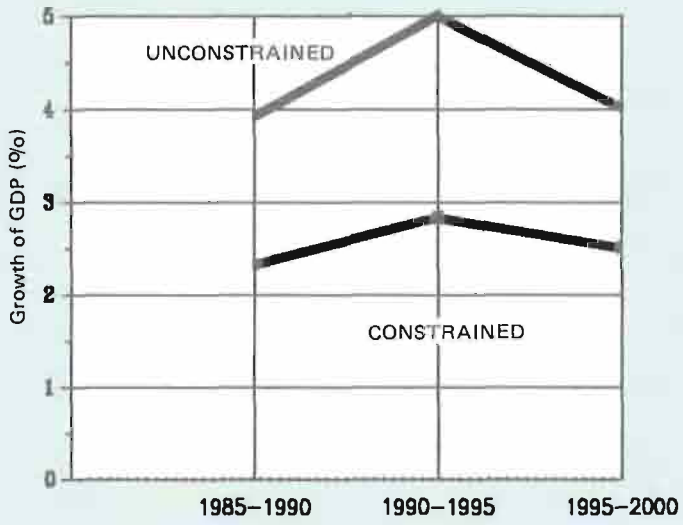


Chart A-VII

GROWTH OF GROSS DOMESTIC PRODUCT:
COMPRESSION OF CAPITAL GOODS VERSUS INTERMEDIATE GOODS IMPORTS
ON THE ASSUMPTION OF COMPLEMENTARITY

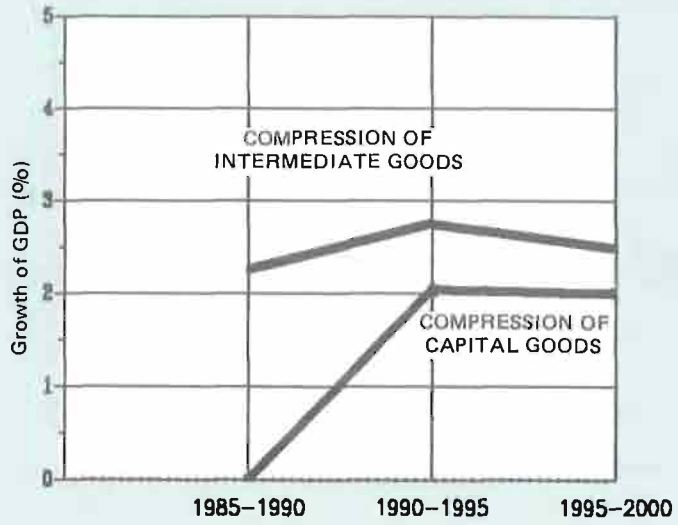


Chart A-VIII

**GROWTH OF GROSS DOMESTIC PRODUCT:
COMPRESSION OF CAPITAL GOODS VERSUS INTERMEDIATE GOODS IMPORTS
ON THE ASSUMPTION OF SUBSTITUTABILITY**

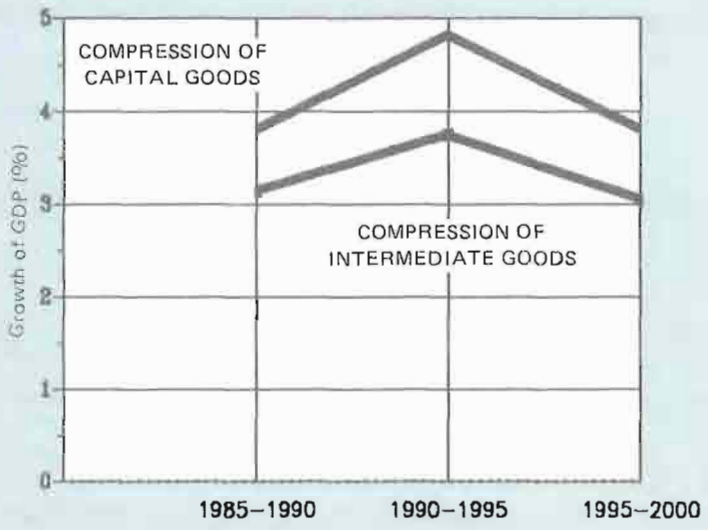
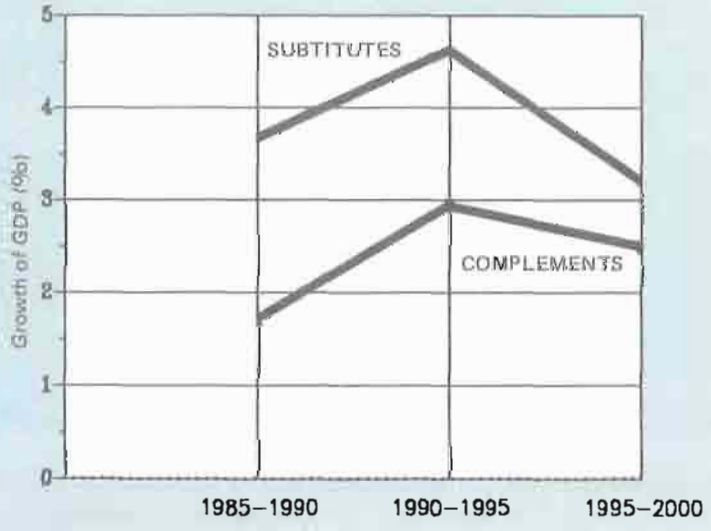


Chart A-IX

**GROWTH OF GROSS DOMESTIC PRODUCT:
INCREASED SAVINGS EFFORT ASSUMING THE SUBSTITUTABILITY OR
ALTERNATIVELY
THE COMPLEMENTARITY OF DOMESTIC AND IMPORTED CAPITAL GOODS**



III. The consequences for international trade of generalized import compression by developing countries

The above analysis of the effects of import compression on the domestic economy was carried out on the assumption that the import capacity of the economy would not be influenced by the policy mix adopted. This assumption was made in order to isolate the impact of import compression *per se*. In reality, a country's import capacity may be improved through altered perceptions of its creditworthiness resulting from an "improved" policy stance, or by means of export expansion measures. However, if the cause of the import compression is a generalized downturn in global demand or an international financial crisis, it is unlikely that much success will be met by developing countries as a whole in either of these two areas, with the result that resort to generalized import compression measures of one sort or another will be inevitable. Other things being equal, there will be a net adverse impact on the export earnings, and hence import capacity, of developing countries. This section presents a scenario representing such a situation, which illustrates that it can have very disturbing implications for the world economy.

In particular, when developing countries severally undertake import compression measures in response to a common set of circumstances, the impact on the world economy is significant and measurable. First, there is the direct effect on their own exports through a fall in trade among themselves. Second, there is a fall in the exports of the rest of the world. For the developed market economies this is likely to trigger second-round effects, as a fall in exports will generally depress aggregate demand to some extent. This, in turn, will reduce their own imports, further slackening the pace of world export demand.

To measure this effect, scenario analysis was carried out with the aid of UNCTAD's System for Interlinked Global Modelling and Analysis (SIGMA).[220] The methodology adopted was to establish a baseline or reference scenario[221] and then construct a "compression" scenario in which the rate of growth of imports of developing countries was reduced by 2.5 percentage points. Chart A-X presents a comparison of these two scenarios. It illustrates that import compression by developing countries of the above magnitude would reduce the growth of world trade by 0.5 to 0.75 of a percentage point, depending on the time horizon. This slower growth of trade would be brought about by a fall in the growth of trade among developing countries, on the one hand, and by a reduction in the imports of developed market-economy countries, on the other, resulting from a fall in the latter's aggregate demand averaging about 0.2 percentage points for the projection period as a whole.

While highly significant, the above estimate may not fully capture the negative consequences of generalized import compression by developing countries. For instance, if the intention of each country were to reduce its trade deficit (or increase its trade surplus) by a given amount the target would not be achieved *ex post*, as export revenues would also be reduced. Indeed, as chart A-XI illustrates, the scenarios indicate that the developing countries could fall short of the desired improvement in their trade balance by more than 25 per cent in the absence of further measures, which could easily provoke renewed bouts of import compression, further depressing world trade.

At the same time, such secondary policy responses may not be limited to developing countries. Generalized import compression by developing countries would reduce (and has reduced) trade balances of the developed market economies. Chart A-XII presents the consequences for these trade balances of the scenarios depicted here. The impact on developed market economies' balances is significantly negative and cumulative, even taking into account the reduction in their growth rates. If the overall surplus of the developed market economies *vis-à-vis* the developing countries were evenly distributed among the countries of the group, there would not need to be a significant policy response to reduced trade surpluses. However, in so far as the trade surplus of developed market economies as a whole is made up of large surpluses in some

220 See "Scenarios of growth, trade, finance and debt" (UNCTAD/ST/MFD/5) for a technical description.

221 The baseline scenario is essentially that contained in TD/328 Rev.1.

Chart A-X

GENERALIZED IMPORT COMPRESSION BY DEVELOPING COUNTRIES: IMPACT ON GROWTH OF WORLD TRADE

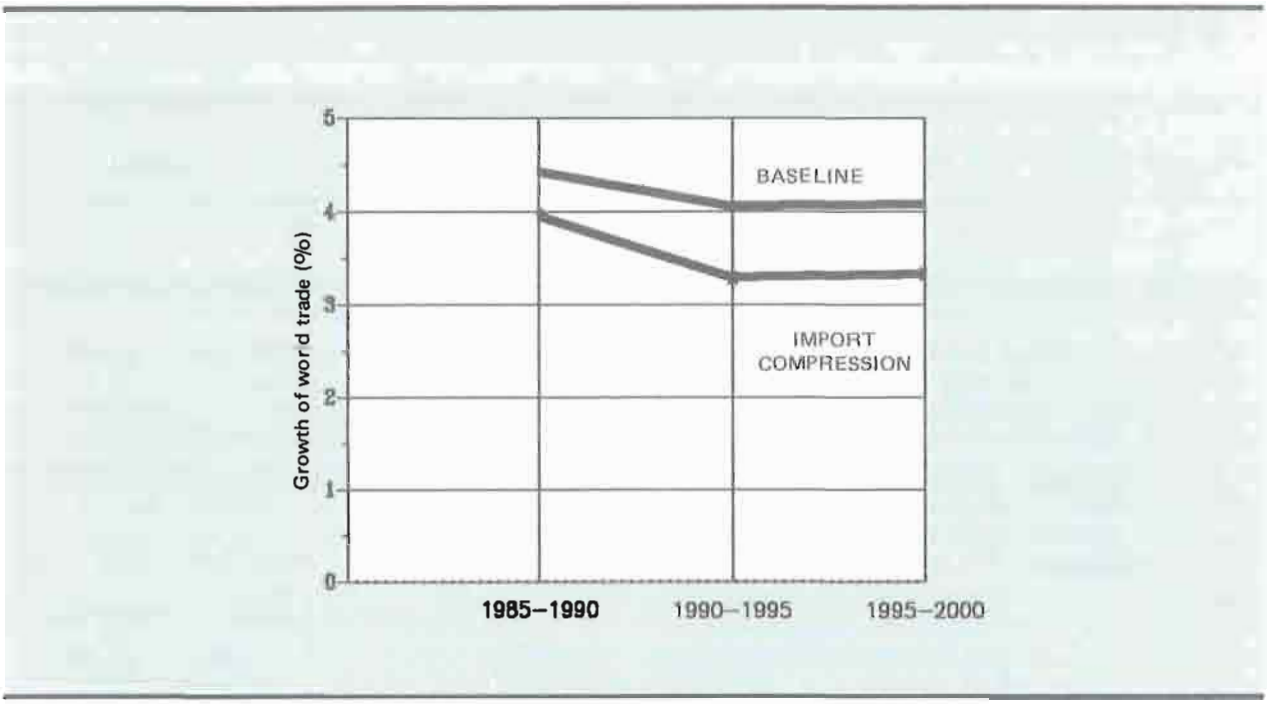


Chart A-XI

GENERALIZED IMPORT COMPRESSION BY DEVELOPING COUNTRIES: ERROR IN ACHIEVING TARGETED IMPROVEMENTS IN TRADE BALANCES OF DEVELOPING COUNTRIES

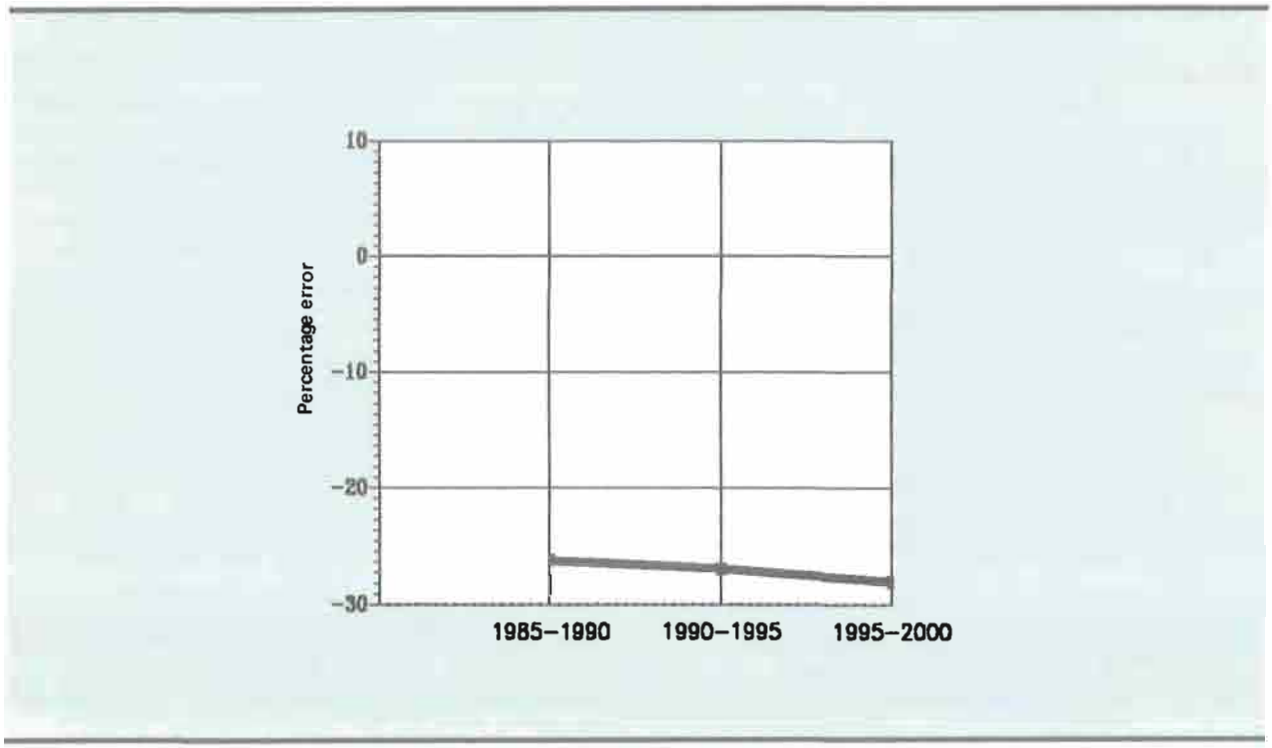
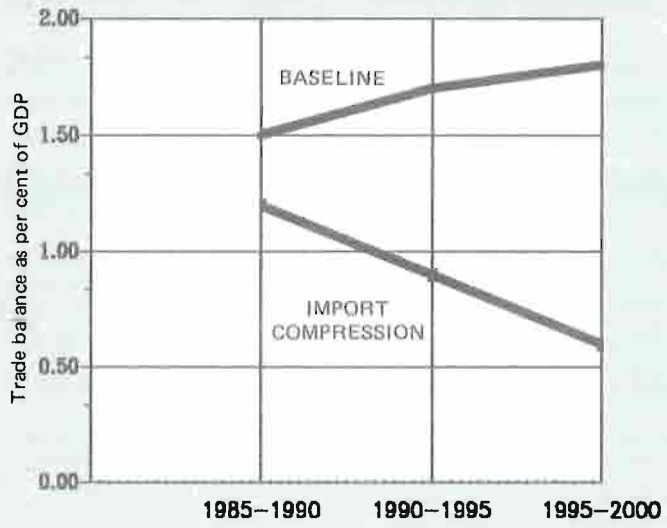


Chart A-XII

GENERALIZED IMPORT COMPRESSION BY DEVELOPING COUNTRIES: IMPACT ON TRADE BALANCES OF DEVELOPED MARKET-ECONOMY COUNTRIES



countries partly offset by large deficits in others, as is presently the case, the fall in world export demand may result in increased trade deficits for certain countries. In such a situation, the attempt by those countries to control their deficits could easily result in a further net negative impact on world trade.

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Annex 7

STATISTICAL ANNEX

Annex table *Page*

Annex table 1

GROSS DOMESTIC EXPENDITURE ON R AND D: NATIONAL TRENDS IN OECD COUNTRIES

(All fields of science)

Country	Total expenditure		Annual growth rate (%)					Total expenditure
	Amount ($ mil)	Percentage of OECD total						($mil)
	1981		1969-81	1969-75	1975-81	1979-81	1981-83	1983
United States	73678	46.4	1.8	-0.6	4.2	4.5	3.8	88329
Japan [a]	25574	16.1	8.1	8.3	7.9	11.2	8.2	33493
Germany Fed. Rep. of	15644	9.9	5.4	6.2	4.7	2.6	1.9	18130
France	10700	6.7	3.1	2.3	4.2	5.0	4.7	13134
United Kingdom	11369	7.2	2.2	1.3	3.1	2.9	-0.7	12552
Italy	4546	2.9	4.7	4.9	4.6	11.4	4.9	5568
Canada	3877	2.4	1.9	-0.9	4.8	8.5	3.5	4619
Spain	908	0.6	9.4	15.7	3.4	3.8	..	..
Australia	1539	1.0	..	..	2.2	2.8	..	..
Netherlands	2508	1.6	2.3	3.6	0.9	0.1	3.5	2992
Turkey	..	..	..	..	..	..	..	..
Sweden	2166	1.4	7.2	8.9	5.6	10.0	7.1	2776
Belgium [b]	1065	0.9	4.3	4.4	4.1	..	..	..
Switzerland	1785	1.1	1.2	1.6	0.8	0.6	-0.5	1979
Austria	765	0.5	9.9	12.9	6.9	6.9	4.5	932
Yugoslavia	521	..	0.3	..	..	..	..	..
Denmark	539	0.3	3.1	3.4	2.9	4.9	..	..
Norway	593	0.4	6.3	9.3	3.3	-0.4	6.4	757
Greece	102	0.1	..	..	..	..	..	..
Finland	499	0.3	8.2	8.7	7.7	10.5	8.5	655
Portugal	154 [c]	0.1 [c]	3.7	0.7	6.9	6.1	..	..
New Zealand	240	0.2	7.0	11.7	2.6	8.9	..	..
Ireland	155	0.1	5.1	7.6	2.7	5.9	..	..
Iceland	18	0.0	9.9	19.9	0.7	4.0	..	..
Total OECD	158720	100.0	3.5	2.0	4.5	5.5	4.0	..
of which:								
EEC	46940	29.5	4.0	3.5	4.0	4.0	2.5	..

Source: OECD, *Selected science and technology indicators: recent results, 1979-1986* Paris, Sept. 1986.

a Figures as adjusted by the OECD secretariat in 1981 are $23,408 million or 15 per cent of the OECD total and in 1983 $30,750 million.

b 1979.

c 1982.

Annex table 2

TOTAL NATIONAL EXPENDITURES ON R AND D [a] AS A PERCENTAGE OF GROSS NATIONAL PRODUCT IN SELECTED DMECs, 1961-84

Year	*France* [b]	*Fed.Rep.of Germany*	*Japan*	*United Kingdom*	*United States*
1961	1.37	..	1.39	2.47	2.73
1962	1.47	1.25	1.47	..	2.73
1963	1.55	1.41	1.44	..	2.87
1964	1.82	1.57	1.48	2.30	2.96
1965	2.00	1.72	1.52	..	2.89
1966	2.07	1.81	1.46	2.32	2.88
1967	2.12	1.96	1.52	2.30	2.89
1968	2.08	1.98	1.60	2.26	2.82
1969	1.93	1.82	1.64	2.27	2.71
1970	1.92	2.06	1.85	..	2.63
1971	1.90	2.18	1.85	..	2.48
1972	1.90	2.20	1.86	2.11	2.40
1973	1.77	2.09	1.90	..	2.31
1974	1.79	2.13	1.97	..	2.29
1975	1.80	2.22	1.96	2.19	2.27
1976	1.78	2.15	1.95	..	2.27
1977	1.76	2.14	1.93	..	2.23
1978	1.76	2.24	2.00	2.24	2.22
1979	1.81	2.40	2.09	..	2.27
1980	1.84	2.42	2.22	..	2.38
1981	2.01	2.49	2.38	2.41	2.43
1982	2.10	2.58	2.47	..	2.58
1983 [c]	2.15	2.57	2.61	2.24	2.62
1984 [d]	2.22	..	..	..	2.62

Source: National Science Board, *Science Indicators, 1985*, Washington D.C., 1985, p.187.

a Gross expenditures for performance of R and D including associated capital expenditures, except for the United States, where total capital expenditure data are not available. US estimates for the period 1972-1980 show that the inclusion of capital expenditures would have an impact of less than one tenth of 1 per cent on the R and D/GNP ratio.

b Percentage of gross domestic product

c Preliminary.

d Estimated.

Annex table 3

ESTIMATED NON-DEFENCE R AND D EXPENDITURES [a] AS A PERCENTAGE OF GROSS NATIONAL PRODUCT IN SELECTED DMECs, 1971-1984

Year	*France* [b]	*Fed.Rep.of Germany*	*Japan*	*United Kingdom*	*United States*
1971	1.46	2.03	1.84	..	1.68
1972	1.50	2.08	1.84	1.50	1.63
1973	1.38	1.94	1.89	..	1.62
1974	1.43	1.98	1.96	..	1.69
1975	1.46	2.08	1.95	1.	1.68
1976	1.44	2.01	1.94	..	1.68
1977	1.44	2.01	1.92	..	1.67
1978	1.41	2.10	1.98	1.51	1.69
1979	1.42	2.27	2.08	..	1.75
1980	1.43	2.30	2.21	..	1.86
1981	1.51	2.38	2.37	1.72	1.87
1982	1.63	2.48	2.46	..	1.94
1983 [c]	1.69	2.47	2.60	1.61	1.91
1984 [d]	1.76	..	..	..	1.86

Source: National Science Board, *Science Indicators, 1987,* Washington, D.C., 1985, p. 187.

a Gross expenditures for performance of R and D including associated capital, except for the United States, where total capital expenditure data are not available. US estimates for the period 1972-1980 show that the inclusion of capital expenditures would have had an impact of less than one tenth of 1 percent on the R and D/GNP ratio.

b Gross domestic product

c Preliminary.

d Estimated.

Annex table 4

INDUSTRIAL R AND D EXPENDITURES AS A PERCENTAGE OF VALUE ADDED IN MANUFACTURING INDUSTRY IN SELECTED DMECs

Year	*United States*	*United Kingdom*	*Fed.Rep.of Germany*	*France*	*Japan*
1967	2.49	2.00	1.28	1.42	0.84
1971	2.09	1.73	1.60	1.34	1.22
1975	1.93	1.72	1.65	1.36	1.28
1979	1.94	1.87	2.08	1.37	1.37
1980	1.97	..	..	1.43	1.49
1981	2.03	..	2.15	1.53	1.62
1982	2.19	2.14	2.28	1.57	1.72
1983	2.21	1.93	2.28	1.58	1.86

Source: United States Congress, Joint Economic Committee, *Technology and trade: indicators of U.S. industrial innovation*, U.S. Government Printing Office, Washington, D.C. 1986; and National Science Board, *Science Indicators 1982*, p. 201.

Annex table 5

DOMESTIC PATENT APPLICATIONS PER 100,000 POPULATION

Country	*1965*	*1970*	*1975*	*1980*	*1985*
			A. DMECs		
Japan	62	97	121	142	227
Switzerland	96	95	91	68	71
Germany, Fed. Rep. of	65	54	49	50	65
Sweden	62	54	49	50	55
Australia	35	31	31	45	45
United Kingdom	45	45	37	35	39
Finland	18	19	25	28	36
Austria	37	30	33	31	33
New Zealand	30	32	40	37	31
United States	37	37	30	27	27
France	36	28	23	21	25
Norway	23	24	19	18	23
Netherlands	20	19	14	14	20
Ireland	5	7	10	12	20
Denmark	24	17	16	19	18
Greece	10	16	18	14	11
Belgium	19	14	11	10	10
Iceland	..	9	6	8	9
Canada	9	9	8	7	8
Spain	13	9	5	5	6
Italy	14	13	11	11	4
Portugal	1	2	1	1	1
			B. Selected socialist countries of Eastern Europe		
German Democratic Rep.	31	29	27	39	71
USSR	44	46	45	62	59
Czechoslovakia	45	40	43	49	56
Hungary	14	12	10	15	27
Poland	13	17	20	17	14
			C. Selected developing countries		
Yugoslavia	4	5	6	6	5
Argentina	..	8	6	5	4 [a]
Kenya	1	2	2	3	3 [b]
Cuba	..	..	2	1	2
Iraq	2	..	..	..	2
Brazil	12	4	..	2	1
Mexico	2	2	1	1	1
Egypt	1	1	1	1	..
Morocco	2	2	3	3	..

Source: OECD, *Selected science and technology indicators: recent results 1979-1986*, Paris, September 1986, for 1965-1980 data on OECD countries; and UNCTAD secretariat calculations for all other figures, based on: WIPO: *100 Years of Industrial Property Statistics 1883-1982*, Geneva, 1983; *Industrial Property Statistics 1983*, Publication B, Geneva, 1984; *Industrial Property Statistics (Patents) 1985*, Publication A, Geneva, 1987; and United Nations demographic data.

Note: Patent laws differ between countries or groups of countries, namely on patentability of products or processes, duration and procedures for application. For example, some countries (USSR, Czechoslovakia, Cuba) grant also 'inventors' certificates'. For these reasons, figures are not strictly comparable.

a 1984.

b 1982.

Annex table 6

GROSS DOMESTIC PRODUCT PER EMPLOYED PERSON AND PRODUCTIVITY LEVELS [a] IN FOUR DMECs COMPARED WITH UNITED STATES LEVELS

(United States in each year = 100)

Year	*Japan*	*France*	*Fed.Rep.of Germany*	*United Kingdom*
1950	16.6	41.2	37.0	57.8
1955	20.1	44.2	44.5	56.3
1960	25.6	52.3	55.7	58.3
1961	28.2	53.8	56.3	58.1
1962	28.7	55.1	56.4	56.3
1963	30.7	56.4	56.4	57.1
1964	33.3	57.6	58.4	57.5
1965	33.2	58.3	59.2	56.3
1966	35.0	59.0	61.5	55.6
1967	37.8	61.4	60.8	57.6
1968	40.9	62.0	62.9	58.9
1969	45.3	65.1	66.3	59.4
1970	49.5	69.2	69.4	61.5
1971	50.0	70.5	69.1	62.5
1972	52.9	72.4	70.4	61.7
1973	55.0	73.8	71.6	63.9
1974	56.1	77.7	74.9	64.9
1975	57.5	78.5	75.7	64.6
1976	58.8	80.3	78.9	66.3
1977	60.0	80.6	80.0	65.5
1978	61.9	82.8	81.5	67.1
1979	64.5	86.0	84.1	67.9
1980	67.5	87.6	85.4	67.6
1981	68.7	87.1	84.8	68.3
1982	71.0	90.0	86.6	71.6
1983	70.4	89.2	86.9	72.7
1984	72.0	89.0	86.9 [b]	70.8

Source: As for Annex table 4 (based on unpublished data of the Bureau of Labor Statistics).

a Relative productivity levels are calculated at purchasing-power-parity exchange rates, an adjustment which corrects for domestic inflation and for changes in relative exchange rates.

b Based on preliminary estimates.

Annex table 7

PRODUCTIVITY GROWTH IN MANUFACTURING INDUSTRY IN SELECTED DMECs, 1960-1984

(Index numbers, 1977 = 100)

Year	*United States*	*Japan*	*France*	*Fed.Rep.of Germany*	*United Kingdom*
1960	60.0	22.0	36.3	39.8	53.8
1961	61.6	24.9	38.4	41.9	54.0
1962	64.3	26.0	40.7	44.6	55.2
1963	68.9	28.1	42.7	46.7	58.1
1964	72.3	31.8	45.9	50.7	61.9
1965	74.6	33.1	49.0	53.9	63.9
1966	75.4	36.5	52.9	56.0	66.0
1967	75.3	41.9	56.1	59.5	69.2
1968	78.0	47.1	62.0	64.5	74.1
1969	79.3	54.5	65.6	68.9	75.9
1970	79.2	61.4	69.3	70.9	77.6
1971	84.0	65.3	73.1	73.5	81.4
1972	88.2	72.7	77.5	78.5	87.3
1973	93.0	80.2	82.0	83.4	93.1
1974	90.8	82.1	85.0	87.2	95.4
1975	93.4	85.3	88.4	89.8	94.5
1976	97.6	93.3	94.9	96.2	99.4
1977	100.0	100.0	100.0	100.0	100.0
1978	100.9	107.9	105.9	102.5	101.6
1979	101.6	117.4	110.6	107.4	102.1
1980	101.7	128.6	112.4	108.4	99.9
1981	104.9	135.7	116.0	110.3	106.1
1982	107.1	145.4	123.5	111.6	110.9
1983	111.6	152.8	128.8	116.8	118.3
1984 [a]	115.6	167.4	135.2	122.3	123.0

Source: As for Annex table 4 (based on unpublished data of the Bureau of Labor Statistics).

a Preliminary.

Annex table 8

DMECs: BALANCE OF TRADE IN MANUFACTURES BY COUNTRY AND CATEGORY OF R AND D INTENSITY

(Millions of dollars)

A. Total manufactures

Reporting country	*1970*	*1975*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
TOTAL DMECs	23 957	91 425	136 132	165 586	139 834	109 081	6 9 263	51 075
Australia	-1 294	-2 691	-5 295	-8 137	-9 383	-6 708	-10 201	-11 501
Austria	-304	-583	-2 586	-974	-601	-1 359	-823	-493
Belgium-Luxembourg	1 659	3 171	2 962	4 500	3 667	3 962	3 448	4 365
Canada	-208	-6 774	-5 970	-8 285	-1 329	-3 960	-5 345	-6 985
Denmark	-748	-832	-852	512	-92	824	331	-349
Finland	103	-447	2 828	3 801	3 235	2 798	3 724	3 114
France	1 670	9 947	8 518	10 213	2 433	5 338	8 789	6 847
Germany, Fed. Rep. of	11 240	31 880	45 400	47 090	52 675	42 949	45 6 33	49 119
Greece	-1 412	-2 185	-3 532	-3 130	-3 293	-3 105	-3 020	-3 398
Iceland	-89	-314	-477	-459	-568	-487	-480	-522
Ireland	-522	-424	-1 991	-2 376	-1 323	-249	235	712
Italy	2 822	10 678	12 027	18 799	18 442	19 636	15 893	15 393
Japan	10 404	34 726	77 608	100 689	89 918	96 119	113 383	119 682
Netherlands	-88	4 579	5 743	9 289	10 205	9 686	10 440	8 470
New Zealand	62	-813	72	-86	-470	-163	-1 116	-871
Norway	-1 470	-2 932	-6 083	-5 763	-6 040	-4 780	-5 273	-5 797
Portugal	-331	-679	-1 135	-1 822	-1 789	-454	543	943
Spain	-1 230	-2 578	2 041	2 006	2 660	3 134	5 793	5 550
Sweden	321	744	2 382	3 991	3 005	4 674	6 135	5 186
Switzerland	-559	1 180	-2 755	-1 093	-299	-766	-1 285	-763
United Kingdom	2 093	2 835	2 996	-535	-5 378	-13 209	-16 686	-13 322
United States	1 837	12 937	4 231	-2 644	-15 838	-44 800	-100 855	-124 305

(For source see end of table.)

Annex table 8 (continued)

DMECs: BALANCE OF TRADE IN MANUFACTURES BY COUNTRY AND CATEGORY OF R AND D INTENSITY

(Millions of dollars)

B. High R and D intensity

Reporting country	*1970*	*1975*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
TOTAL DMECs	6 764	19 697	39 338	41 938	40 396	37 530	31 385	28 808
Australia	-730	-1 161	-2 330	-3 023	-3 041	-2 631	-3 052	-3 462
Austria	-96	-309	-546	-464	-404	-327	-240	-328
Belgium-Luxembourg	-342	-719	-340	22	-58	-159	-556	-342
Canada	-648	-2 324	-4 958	-5 695	-4 705	-5 608	-6 972	-6 979
Denmark	-264	-378	-629	-629	-448	-497	-512	-545
Finland	-228	-683	-954	-901	-757	-829	-808	-842
France	-166	797	-427	-7	755	1 154	1 929	2 048
Germany, Fed. Rep. of	2 280	5 731	9 546	7 662	9 108	8 025	8 552	6 821
Greece	-168	-355	-617	-528	-505	-584	-580	-641
Iceland	-11	-44	-98	-86	-79	-69	-62	-99
Ireland	-104	-62	-1	55	237	563	845	1 038
Italy	18	30	-1 122	-986	-374	-115	-1 078	-1 557
Japan	1 054	4 180	14 742	18 806	16 790	20 867	27 754	28 105
Netherlands	-57	481	355	842	800	720	808	353
New Zealand	-149	-381	-558	-796	-746	-598	-741	-911
Norway	-250	-554	-993	-1 021	-937	-939	-1 151	-1 128
Portugal	-116	-234	-597	-634	-579	-625	-277	-244
Spain	-527	-1 411	-2 044	-1 947	-1 856	-1 676	-1 271	-1 562
Sweden	-118	55	12	172	15	-99	-112	-115
Switzerland	858	2 230	3 300	3 265	3 313	2 753	2 621	2 793
United Kingdom	1 261	2 888	4 983	4 510	3 870	1 472	332	655
United States	5 269	11 922	22 613	23 320	19 997	16 735	5 953	5 751

(For source see end of table.)

Annex table 8 (continued)

DMECs: BALANCE OF TRADE IN MANUFACTURES BY COUNTRY AND CATEGORY OF R AND D INTENSITY

(Millions of dollars)

C. Medium R and D intensity

Reporting country	*1970*	*1975*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
TOTAL DMECs	15 541	57 582	95 286	109 307	94 137	79 431	69 1 23	59 215
Australia	-1 258	-2 883	-4 760	-5 772	-6 253	-5 011	-6 614	-7 361
Austria	-461	-688	-2 342	-1 448	-1 115	-1 466	-1 112	-1 067
Belgium-Luxembourg	-34	369	-2 155	-613	271	334	418	1 114
Canada	-795	-5 343	-8 622	-9 057	-3 724	-4 487	-5 025	-6 683
Denmark	-465	-686	-382	-31	-249	-402	-752	-1 082
Finland	-627	-1 521	-2 259	-1 743	-1 701	-1 947	-1 786	-1 737
France	1 224	6 209	8 077	7 189	3 628	5 170	6 468	5 937
Germany, Fed. Rep. of	10 446	26 599	47 544	45 738	48 622	43 762	44 623	48 015
Greece	-487	-1 196	-2 041	-1 990	-2 152	-1 914	-1 890	-2 022
Iceland	-44	-149	-290	-307	-287	-237	-268	-270
Ireland	-397	-683	-1 386	-1 187	-617	-460	-481	-413
Italy	1 739	5 581	4 544	6 477	6 616	8 698	7 448	7 393
Japan	4 305	17 170	52 184	65 134	58 003	63 406	74 004	81 527
Netherlands	-876	-309	52	1 061	1 236	1 280	1 169	312
New Zealand	-431	-1 046	-1 581	-1 767	-1 929	-1 745	-2 208	-2 042
Norway	-906	-1 867	-3 626	-3 319	-3 044	-2 679	-2 911	-3 652
Portugal	-456	-759	-1 980	-2 343	-2 086	-1 400	-989	-1 007
Spain	-826	-1 769	-737	-444	-559	-394	201	369
Sweden	-203	-208	472	1 152	736	770	1 701	1 274
Switzerland	-85	1 541	1 034	1 879	1 873	1 700	1 418	1 907
United Kingdom	3 265	6 166	6 770	4 622	1 153	-3 577	-2 990	-1 599
United States	2 911	13 053	6 772	6 078	-4 285	-19 970	-41 301	-59 698

(For source see end of table.)

Annex table 8 (concluded)

DMECs: BALANCE OF TRADE IN MANUFACTURES BY COUNTRY AND CATEGORY OF R AND D INTENSITY

(Millions of dollars)

D. Low R and D intensity

Reporting country	*1970*	*1975*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
TOTAL DMECs	1 652	14 146	1 508	14 340	5 301	-7 880	-31 245	-36 948
Australia	694	1 353	1 796	658	-89	935	-535	-679
Austria	254	414	301	938	918	435	528	902
Belgium-Luxembourg	2 034	3 521	5 457	5 091	3 454	3 787	3 585	3 593
Canada	1 234	893	7 610	6 466	7 100	6 136	6 651	6 678
Denmark	-18	232	159	1 172	605	1 724	1 595	1 279
Finland	958	1 757	6 042	6 444	5 693	5 574	6 318	5 693
France	612	2 941	868	3 031	-1 950	-986	392	-1 138
Germany, Fed. Rep. of	-1 485	-450	-11 690	-6 310	-5 055	-8 837	-7 542	-5 717
Greece	-757	-635	-874	-611	-635	-606	-550	-734
Iceland	-34	-121	-89	-65	-202	-180	-150	-153
Ireland	-21	321	-604	-1 244	-943	-352	-129	88
Italy	1 065	5 066	8 605	13 308	12 200	11 053	9 522	9 558
Japan	5 045	13 377	10 682	16 749	15 125	11 846	11 625	10 050
Netherlands	845	4 407	5 336	7 386	8 168	7 686	8 463	7 805
New Zealand	642	613	2 210	2 476	2 205	2 180	1 833	2 082
Norway	-314	-511	-1 463	-1 422	-2 059	-1 162	-1 211	-1 017
Portugal	241	314	1 442	1 155	876	1 571	1 809	2 194
Spain	123	603	4 822	4 397	5 075	5 204	6 862	6 742
Sweden	643	898	1 898	2 667	2 254	4 004	4 546	4 027
Switzerland	-1 332	-2 591	-7 089	-6 236	-5 485	-5 220	-5 325	-5 463
United Kingdom	-2 433	-6 218	-8 757	-9 667	-10 401	-11 104	-14 027	-12 379
United States	-6 343	-12 039	-25 153	-32 042	-31 551	-41 566	-65 507	-70 359

Source: United Nations Statistical Office trade data (Comtrade). For the methodology of classification into R and D intensity categories see note *a* to table 32 of the text.

Annex table 9

DMECs: MANUFACTURES IMPORTS FROM A SELECTED GROUP [a] OF DEVELOPING COUNTRIES EXPORTERS OF MANUFACTURES, BY R AND D INTENSITY CATEGORY

R and D intensity	Market share (%)				Value ($ million)	Growth rate (%)		
	1970	1975	1980	1985	1985	1970-75	1975-80	1980-85
High R and D	***2.32***	***6.06***	***7.90***	***11.28***	***17,845***	***45.1***	***28.6***	***13.3***
Electronic components	11.02	21.28	24.95	24.22	4371	40.4	27.6	7.9
Telecommunication equipment	4.94	11.64	19.84	22.50	3226	45.5	33.6	11.3
Non-electrical machinery	1.85	3.31	5.99	16.33	2757	33.0	31.1	30.7
Electrical machinery	1.98	5.48	8.38	15.51	2656	45.3	30.2	18.0
Office machines & computers	1.47	7.45	4.06	9.34	2105	67.8	7.0	35.1
Scientific instruments	1.02	5.26	9.11	7.84	1712	65.4	34.7	0.1
Chemicals	.39	.44	1.27	2.50	560	26.4	56.2	15.7
Aerospace	.34	1.06	.94	1.53	321	42.6	24.3	12.9
Drugs and medecine	3.63	5.17	4.74	3.40	136	27.7	13.3	-3.1
Medium R and D	***2.56***	***3.17***	***4.71***	***7.33***	***27242***	***23.5***	***29.8***	***12.5***
Other manufacturing industries	12.83	11.08	12.20	20.34	7586	14.5	30.9	7.4
Other electrical machinery	5.66	10.32	15.73	18.73	6868	35.2	27.2	10.6
Other non-electrical machinery	.65	1.33	2.36	6.20	5016	34.9	31.3	24.6
Other chemicals	1.42	1.48	2.15	3.71	2931	20.4	28.7	13.9
Rubber, plastics	6.07	5.91	7.80	12.74	2028	21.9	26.3	12.4
Transport equipment	.23	.59	.94	1.87	2042	44.5	31.9	22.0
Other scientific instruments	.64	2.02	4.53	7.07	579	50.5	41.9	13.2
Non-ferrous metals	.78	.76	3.34	4.38	194	8.0	61.5	-4.3
Low R and D	***7.27***	***8.34***	***10.32***	***14.36***	***54691***	***22.5***	***22.1***	***6.7***
Textiles, clothing, footwear, leather	13.78	20.31	23.11	29.10	27675	28.3	21.4	6.7
Petroleum refineries	2.32	2.96	4.06	7.54	5287	38.9	29.8	14.0
Food, drink, tobacco	10.47	9.04	9.84	11.19	8452	14.2	15.4	1.3
Wood, cork, furniture	10.72	11.23	11.75	14.01	3571	17.1	23.4	1.7
Ferrous metals	1.89	1.76	4.20	8.56	3139	145	35.2	12.6
Fabricated metal products	2.46	3.92	7.60	13.56	3255	30.5	35.0	11.8
Stone, clay, glass	1.80	2.73	4.86	10.48	1610	27.0	34.6	16.2
Paper and printing	.63	1.26	2.59	3.38	1192	34.2	34.4	6.3
Shipbuilding	2.18	1.09	6.34	15.12	511	7.4	44.4	10.2
Total manufactures	***4.87***	***6.13***	***7.78***	***10.95***	***99779***	***24.6***	***24.6***	***9.2***

Source: As for Annex table 8.

a Argentina, Brazil, Hong Kong, India, Malaysia, Mexico, Republic of Korea, Singapore, Taiwan Province of China and Yugoslavia.

Annex table 10

DMECs: MANUFACTURES IMPORTS FROM OTHER DEVELOPING COUNTRIES [a] BY R AND D INTENSITY CATEGORY

R and D intensity	Market share (%)				Value ($ million)	Growth rate (%)		
	1970	1975	1980	1985	1985	1970-75	1975-80	1980-85
High R and D	***0.82***	***1.11***	***2.12***	***2.09***	***3307***	***27.3***	***38.8***	***5.2***
Electronic components	.99	1.61	5.89	6.88	1241	34.9	60.2	11.9
Aerospace	1.37	2.35	2.41	2.40	504	27.2	28.0	2.4
Chemicals	.13	.14	2.76	2.10	471	24.6	130.5	-4.3
Scientific instruments	.41	.82	1.21	1.52	332	38.0	30.4	8.0
Electrical machinery	.63	1.24	1.42	1.60	275	36.1	22.9	7.0
Non-electrical machinery	.70	.86	1.47	1.54	261	23.1	30.0	8.0
Telecommunication equipment	1.15	.89	.95	.71	102	16.3	21.5	2.5
Drugs and medecine	4.56	4.58	3.19	1.75	70	19.6	7.1	-8.1
Office machines and computers	.06	.09	.24	.23	52	32.0	47.6	13.2
Medium R and D	***2.40***	***2.04***	***2.23***	***1.89***	***7012***	***14.6***	***22.1***	***-0.4***
Other chemicals	3.54	2.77	2.35	2.90	2292	13.7	15.5	6.5
Other manufacturing industries	4.50	4.36	3.98	5.77	2153	17.2	26.1	4.5
Non-ferrous metals	29.82	33.82	37.85	27.37	1209	11.2	22.6	-15.1
Other non-electrical machinery	.21	.31	.40	.48	390	26.6	23.1	6.5
Transport equipment	.10	.18	.29	.34	370	33.9	33.0	9.7
Other electrical machinery	.36	.70	1.06	.84	309	36.1	27.1	2.1
Rubber, plastics	.65	.64	1.03	1.40	222	22.1	31.4	8.3
Other scientific instruments	.34	.57	.93	.81	66	30.3	33.7	0.6
Low R and D	***9.23***	***11.09***	***11.50***	***11.54***	***43954***	***23.6***	***17.9***	***-0.1***
Petroleum refineries	34.75	33.52	25.61	31.86	22346	31.3	23.3	-1.5
Textiles, clothing, footwear, leather	6.37	7.03	8.34	10.40	9896	21. 1	22.4	6.5
Food, drink, tobacco	15.38	16.02	11.15	9.76	7367	18.5	5.5	-3.9
Wood, cork, furniture	5.76	5.31	6.55	8.01	2041	14.2	27.5	2.2
Ferrous metals	1.53	2.28	2.24	3.02	1108	25.6	13.3	3.8
Paper and printing	.52	.50	.76	1.03	364	15.8	26.6	7.2
Stone, clay, glass	1.59	1.54	1.22	2.24	345	16.1	14.6	12.4
Shipbuilding	3.26	3.12	7.19	7.43	251	22.4	20.1	-6.8
Fabricated metal products	.45	.68	.81	.99	237	29.2	22.5	3.6
Total manufactures	***5.59***	***6.45***	***6.53***	***5.96***	***54273***	***22.4***	***19.0***	***0.2***

Source: As for Annex table 8.

a All developing countries other than those covered by Annex table 9.

Annex table 11

WORLD MARKET PRICES OF NON-OIL PRIMARY COMMODITIES EXPORTED BY DEVELOPING COUNTRIES, 1983-1986

(Index numbers, fourth quarter 1982 = 100)

Item	Year/quarter																
	1983				*1984*				*1985*				*1986*				*1987*
	I	*II*	*III*	*IV*	*I*	*II*	*III*	*IV*	*I*	*II*	*III*	*IV*	*I*	*II*	*III*	*IV*	*I*
Food and tropical beverages	101	108	112	118	118	116	107	104	103	97	95	107	133	123	112	110	96
Non-food primary commodities	105	113	118	116	121	119	108	105	103	105	99	94	91	92	88	92	100
Vegetable oilseeds and oils	102	117	159	172	198	214	169	163	152	145	113	102	88	78	70	84	88
Agricultural raw materials	104	114	115	114	117	113	104	101	97	101	99	96	97	100	96	100	113
Minerals, ores and metals	105	111	109	103	104	101	95	94	94	98	95	89	86	88	86	86	90
Total primary commodities																	
of which:																	
Denominated in US dollars	103	111	115	117	119	117	108	104	103	101	96	101	113	108	100	100	97
Denominated in SDRs	102	111	118	121	123	122	115	114	115	110	101	102	110	100	90	90	83
Effective exchange rate	97	100	104	104	105	106	112	115	122	118	112	104	98	94	90	90	84
Manufactures	103	101	99	98	99	99	95	93	90	94	99	106	113	116	122	123	.

Source: UNCTAD secretariat calculation based on the following international sources: UNCTAD, *Monthly Commodity Price Bulletin;* United Nations, *Monthly Bulletin of Statistics* (various issues); IMF, *International Financial Statistics.*

Annex table 12

PRICES AND COSTS IN THE ECONOMIES OF THE MAJOR OECD COUNTRIES

(Average annual percentage change)

Country	*GDP deflator*	*Unit labour costs* [a]	*Import costs* [b]	*Consumer prices*	*Final output deflator* [c]	*Cost inflation* [d]
1973-1982						
United States	7.7	8.2	12.1	9.0	8.3	8.8
Japan	7.0	7.4	12.8	8.3	7.6	8.5
France	10.8	11.9	11.7	11.4	10.9	11.8
Germany, Federal Republic of	4.8	4.5	7.1	5.0	5.2	5.4
United Kingdom	14.1	14.6	14.6	14.7	14.2	14.6
1983-1986						
United States	3.5	3.1	-2.1	2.9	2.8	2.3
Japan	1.5	1.2	-14.6	1.7	-0.2	-2.1
France [e]	6.9	5.2	0.5	6.3	6.4	3.8
Germany, Federal Republic of	2.6	0.7	-1.7	1.9	1.7	-0.2
United Kingdom	4.8	3.5	3.6	4.7	4.5	3.5

Source: UNCTAD secretariat estimates, based on OECD national accounts and other OECD data.

a Business sector.

b Implicit import price deflator.

c Implicit price deflator of total final demand.

d Weighted average of import and labour costs.

e 1986 figures are for the first half only.

Annex table 13

EXTERNAL ASSETS OF BANKS IN THE BIS REPORTING AREA [a] VIS-À-VIS DEVELOPING COUNTRIES, 1982-1986

Area	1982	1983	1984	1985	1986	Stock at end 1986 [d]
	Percentage rate of increase [b]					
Developing countries and territories [c]	8.0	5.4	0.7	3.6	5.6	507168
Major oil exporters	8.1	8.6	-2.0	1.4	-0.1	200771
Others	7.9	3.0	3.3	5.4	5.9	295589
By region:						
Latin America: Total	6.1	3.1	-0.1	2.7	0.9	252839
Major oil exporters [e]	4.7	3.8	-3.0	2.1	-1.3	104995
Africa: [f] Total	9.8	1.6	-5.0	12.7	10.0	54966
Major oil exporters [g]	17.1	4.5	-6.4	18.0	22.4	27061
West Asia: [f] Total	9.9	20.0	3.1	-2.0	3.8	68937
Major oil exporters [h]	10.8	23.6	0.7	-5.8	-10.6	50989
South and South-East Asia: [i] Total	13.8	7.9	4.1	6.1	6.4	109270
Major oil exporters [j]	35.9	19.2	8.6	7.1	10.5	17009
Memo item:						
All borrowers: Total [k]	9.0	24.2	3.2	18.7	25.4	3221061

Source: Bank for International Settlements, *International Banking Statistics, 1973-1983* (Basle, April 1984) and *International Banking and Financial Market Developments*, various issues.

a Including certain offshore branches of United States banks.

b Based on data for end-December.

c Excluding offshore banking centres, i.e.: in Latin America: Barbados, Bahamas, Bermuda, Netherlands Antilles, Cayman Islands and Panama; in Africa: Liberia; in West Asia: Lebanon; in South and South-East Asia: Hong Kong and Singapore.

d Including a small amount not shown under the regions.

e Ecuador, Mexico, Trinidad and Tobago and Venezuela.

f Libyan Arab Jamahiriya is included in West Asia up to 1982 (since it could not be separated from this area in the BIS series). Since 1983, it is included in Africa.

g Algeria, Angola, Congo, Gabon, Nigeria and (since 1983) Libyan Arab Jamahiriya.

h Bahrain, Iran (Islamic Republic of), Iraq, Kuwait, Libyan Arab Jamahiriya (up to 1982), Oman, Qatar, Saudi Arabia, Syrian Arab Republic and United Arab Emirates.

i Including Oceania.

j Brunei Darussalam and Indonesia.

k Including multilateral financial institutions.

Annex table 14

CLAIMS [a] OF UNITED STATES BANKS ON DEVELOPING COUNTRIES AS A PERCENTAGE OF THEIR CAPITAL, 1978-1986 [b]

Region/country	All United States banks								
	1978	1979	1980	1981	1982	1983	1984	1985	1986 [c]
All developing countries [d]	144.9	159.4	169.2	191.7	183.3	165.9	138.9	112.0	97.1
Latin America	93.6	99.6	109.4	125.0	118.8	106.0	93.5	77.2	69.8
Africa	11.4	11.4	10.8	11.3	10.2	9.2	6.6	4.7	3.5
West Asia	15.3	12.5	11.1	12.0	9.8	10.3	7.8	5.8	4.7
South and South-East Asia	24.5	35.9	37.9	43.4	44.5	40.4	31.0	24.2	19.1
Ten largest debtor countries [e]									
Mexico	22.7	22.6	27.6	36.3	34.4	32.1	27.9	23.2	20.8
Brazil	28.4	27.9	28.7	30.3	31.0	27.3	26.9	22.4	20.6
Venezuela	15.9	16.6	16.4	16.8	15.9	13.7	11.4	9.3	8.1
Argentina	5.8	9.7	12.7	14.0	12.1	11.1	9.1	8.3	7.9
Republic of Korea	8.5	11.8	13.3	14.9	17.6	15.6	11.8	9.4	6.9
Chile	3.2	4.8	6.5	9.5	8.3	7.4	6.9	5.9	5.6
Philippines	5.7	7.2	7.7	8.3	7.8	7.0	5.5	4.9	4.3
Indonesia	4.3	3.6	3.1	3.5	3.8	4.1	3.4	2.4	2.1
Taiwan Province of China	7.1	7.0	7.7	8.0	6.9	4.9	3.3	2.0	2.1
Colombia	3.5	4.7	4.9	5.0	5.2	4.5	3.3	2.4	1.8

	Nine largest banks				
	1982	1983	1984	1985	1986 [c]
All developing countries [d]	284.0	263.4	221.7	181.3	159.4
Latin America	176.5	162.9	146.4	124.2	113.6
Africa	19.3	17.4	12.2	8.7	6.7
West Asia	16.7	18.4	13.7	10.8	8.9
South and South-East Asia	71.5	64.7	49.4	37.6	30.2
Ten largest debtor countries [e]					
Mexico	45.2	43.6	38.9	37.4	35.0
Brazil	48.8	43.6	44.2	32.7	29.8
Venezuela	26.2	23.8	19.9	16.6	14.6
Argentina	19.1	18.3	15.1	14.7	14.1
Republic of Korea	25.8	21.3	15.8	12.2	8.9
Chile	11.0	10.3	9.8	9.2	8.8
Philippines	13.1	11.5	9.6	8.4	7.7
Indonesia	7.5	8.4	6.7	4.7	4.3
Taiwan Province of China	10.5	7.8	5.1	2.8	3.3
Colombia	8.9	7.5	6.0	4.4	3.2

(For source and notes see end of table.)

Annex table 14 (continued)

CLAIMS [a] OF UNITED STATES BANKS ON DEVELOPING COUNTRIES AS A PERCENTAGE OF THEIR CAPITAL, 1978-1986 [b]

Region/country	1982	1983	1984	1985	1986 [c]
	Fifteen next largest banks				
All developing countries [d]	189.6	179.9	146.7	106.1	91.0
Latin America	124.0	117.0	97.5	71.3	64.6
Africa	6.9	7.6	5.7	3.4	2.4
West Asia	10.8	9.3	7.4	4.6	3.5
South and South-East Asia	47.9	46.0	36.1	26.8	20.4
Ten largest debtor countries [e]					
Mexico	37.5	35.3	29.3	22.7	20.6
Brazil	31.8	31.5	28.2	20.8	18.5
Venezuela	15.2	13.4	10.8	7.9	7.0
Argentina	13.3	12.7	10.5	7.8	7.6
Republic of Korea	20.0	21.7	16.0	11.6	7.9
Chile	9.5	8.4	7.4	5.1	5.0
Philippines	8.1	6.7	6.0	5.1	4.1
Indonesia	2.9	2.7	2.9	1.8	1.4
Taiwan Province of China	8.3	5.2	3.5	2.6	2.5
Colombia	3.7	4.0	2.5	1.9	1.3
	All other reporting banks				
All developing countries [d]	76.8	66.0	54.2	45.8	38.9
Latin America	56.8	46.4	39.8	33.4	29.3
Africa	2.3	2.0	1.6	1.4	0.9
West Asia	2.6	3.1	2.2	1.4	1.1
South and South-East Asia	15.1	14.5	10.6	9.6	7.6
Ten largest debtor countries [e]					
Mexico	21.8	19.5	16.5	13.9	12.0
Brazil	12.3	9.5	9.3	8.1	7.5
Venezuela	5.5	4.1	3.4	2.8	2.3
Argentina	4.3	3.4	2.6	2.1	2.0
Republic of Korea	7.7	7.4	5.7	5.6	4.6
Chile	4.9	4.2	3.7	3.0	2.6
Philippines	1.9	2.6	1.3	1.1	1.0
Indonesia	0.4	0.4	0.4	0.4	0.4
Taiwan Province of China	2.4	2.0	1.4	1.0	0.7
Colombia	1.9	1.6	0.9	0.7	0.6

Source: Statistical releases of the Federal Financial Institutions Examination Council (*Country Exposure Lending Survey*).

a Claims cover cross-border and non-local currency lending. The geographical distribution of claims is adjusted to reflect liabilities due to guarantees by non-residents of regions and countries.

b Situation at the end of December.

c September.

d Excluding offshore banking countries overseas: Bahamas, Bahrain, Bermuda, Hong Kong, Lebanon, Liberia, Macao, Netherlands Antilles, Panama and Singapore.

e Ten countries with the largest debt outstanding to all United States banks in September 1986, ordered by size of exposure to them of these banks.

Annex table 15

EXPORT CREDITS EXTENDED BY DAC MEMBER COUNTRIES TO DEVELOPING COUNTRIES, 1980-1986

A. Total export credits [a]

Recipient group of countries	*Net flow ($ million)*				*Growth of outstanding stock (per cent)*				*Stock at end-June 1986 ($ million)*
	1983	*1984*	*1985*	*Jan-June 1986*	*1983*	*1984*	*1985*	*Jan-June 1986*	
All developing countries	8319	-7343	19072	4236	6.8	-5.6	15.4	3.0	146898
of which:									
Latin America	389	-1512	3488	1264	1.2	-4.8	11.6	3.8	34835
Africa	2655	-1927	7446	2198	7.1	-4.8	19.5	4.8	47914
West Asia	1776	-5820	4770	1196	7.5	-22.9	24.3	4.9	25561
South and South-East Asia	3296	1771	2951	-319	12.5	6.0	9.4	-0.9	34144
Memo item:									
Rescheduling countries [b]	36	-1126	3691	1512	0.1	-3.1	10.4	3.9	40753

B. Net flows of medium-term and long-term export credits ($ million)

	1980	*1981*	*1982*	*1983*	*1984*	*1985*
All developing countries						
Total	13480	11262	9348	7385	5776	1531
Private	11299	9196	6665	4757	4449	1662
of which:						
Latin America						
Total	4534	3442	1710	2243	1033	26
Private	3601	2695	894	1284	639	-68
Africa						
Total	4641	3640	3277	3046	1362	927
Private	4345	2934	2429	2535	1010	833
West Asia						
Total	1692	589	1476	455	1266	370
Private	1647	385	1324	522	1442	564
South and South-East Asia						
Total	3082	3143	2546	1476	1910	359
Private	2205	2808	1839	462	1273	452
Memo item:						
Rescheduling countries [b]						
Total	4372	3265	2061	1665	220	-840
Private	4061	2676	1532	781	125	-753

Source: A: Estimates based on OECD Bank for International Settlements, *Statistics on External Indebtedness: Bank and Trade-Related Non-Bank External Claims on Individual Borrowing Countries and Territories* (Paris and Basle), various issues. (The net flow and rate of growth in 1983 are based on the unrevised figures for stocks at the end of 1982 and of 1983.) B: Estimates based on OECD data.

a Sum of bank and non-bank credits extended with official insurance or guarantee and credits extended by official sector of exporting country.

b Countries which rescheduled official or officially-supported debt during 1982-1985.

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