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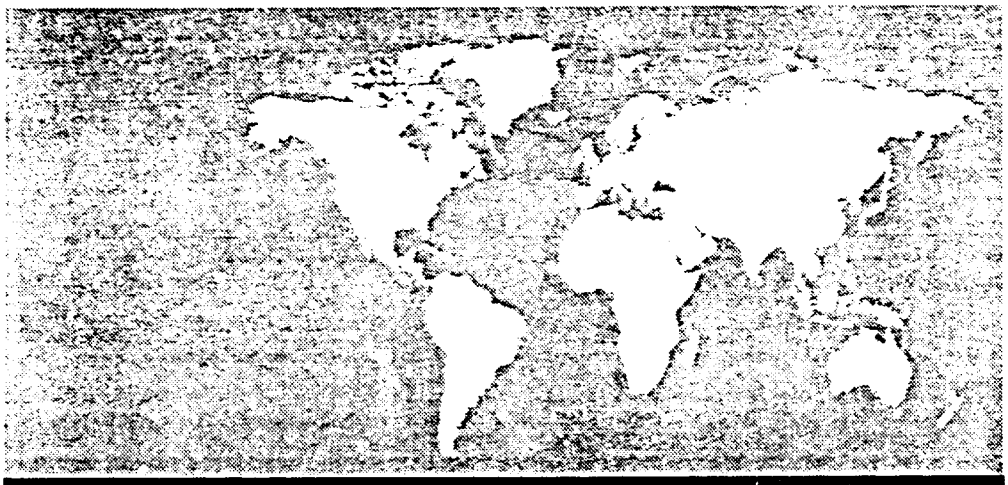

Background Paper

Globalization of manufacturing activity: Evidence and implications for industrialization in developing countries

Prepared by

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LIST OF ABBREVIATIONS

ACP	African, Caribbean and Pacific States
ASEAN	Association of South-East Asian Nations
CAD	Computer-aided design
CIM	Computer-integrated manufacturing
DCs	Developing Countries
ECU	European Currency Unit
EU	European Union
FDI	Foreign Direct Investment
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GNP	Gross national product
ISIC	International Standard Industrial Classification
LDCs	Least developed countries
MERIT	Maastricht Economic Research Institute on Innovation and Technology
MFA	Multi-Fibre Arrangement
NAFTA	North American Free Trade Agreement
NEC	Non-equity forms of cooperation
NIEs	Newly industrializing economies
OECD	Organisation for Economic Co-operation and Development
SITC	Standard International Trade Classification
SMEs	Small- and medium-sized enterprises
TNCs	Transnational corporations
WTO	World Trade Organization

I. DRIVING FORCES OF GLOBALIZATION

Looking back, the next generation's economists may be puzzled by the structure of the world economy in 1995. Today, developing countries (DCs) and the former Soviet bloc account for about one half of world output and the rich industrialized countries for the other.[1/] But this picture is likely to change rapidly over the next 25 years: At current growth rates, the rich world's share of global output could shrink to less than two fifths by 2020. Although the absolute magnitudes are uncertain, it is safe to assume that there will be an enormous shift of economic power from today's rich countries to what are still labelled DCs, and especially to Asian DCs.[2/] This shift is the likely result of the ongoing globalization of economic activities, i.e. the increasing worldwide integration of markets for goods, capital and, last not least, labour.

Globalization refers to an evolving pattern of cross-border activities of firms involving international investment, trade and cooperation for purposes of product development, production and sourcing, and marketing. Complex patterns of cross-border activities increasingly characterize the international economic system and distinguish it from the earlier predominance of arm's length trade in finished goods. Taken at face value, globalization is by no means a principally new phenomenon, since the globalizing economy is first and foremost an expression for an increase in the international division of labour. What is different this time is the sheer weight of new competition, the new mobility of capital and technology, and the fact that more Third World workers are educated and so capable of operating complex machinery. Hence, economic power is dispersed among more actors, and inter-regional competition is heightened. Does this process end up in a deepening divide between rich and poor countries, or will the next 25 years be a time of unprecedented opportunity for DCs? And will globalization foster or retard their industrialization? To answer such questions, it is necessary to understand why globalization has emerged and how it actually proceeds.

The main driving force behind globalization strategies of firms is no different from that which drives international trade. Firms seek to maximize profits, given the constraints they face. Changing or vanishing constraints imply new profit opportunities and thus require new strategies of firms. In a way, globalization is nothing more than the entrepreneurial response to a changing environment, while the leitmotiv of firm behaviour - constrained profit maximization - remains unchanged.

One of the most important reasons for globalization is that large parts of the world have become industrialized since the Second World War. Many DCs, especially in East and South-East Asia, have attained, or are about to attain, the status of an industrialized country. This successful catching-up has increased the number of suppliers on world markets. Global production capacities and international competition have increased, and so have the opportunities to exploit market niches. This process will gain momentum once the large markets of the People's Republic of China, India and Central and Eastern Europe, which represent roughly one half of the world's population, are fully integrated

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1/ Based on purchasing power parity estimates of GNP [World Bank 1994c].

2/ For reasons of convenience, the term DCs as used here includes developing countries that recently achieved or are approaching the status of an industrialized country. Mexico is considered to be part of the non-OECD area. This is because the period under consideration in this study covers the 1980s and early 1990s, while Mexico became an OECD member only in 1994.

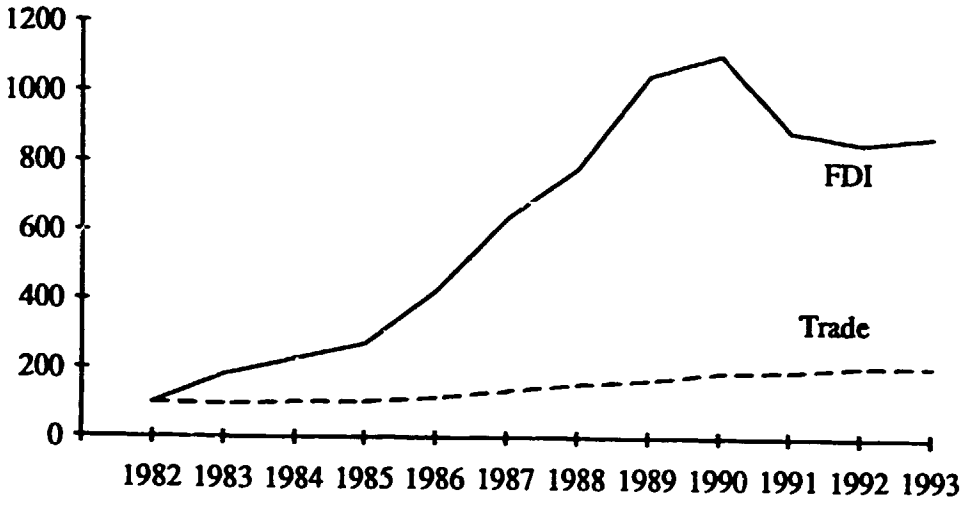
into the world economy. Put differently, the constraint of market size, which may have hindered globalization strategies in the past, has become less relevant and probably no longer applies at all.

At the same time, other constraints that prevented firms from implementing globalization strategies have disappeared. Thanks to the micro-electronics revolution, communication technologies have undergone a dramatic change during the last decade, and new production and organization technologies such as CAD (computer-aided design) and CIM (computer-integrated manufacturing) have evolved. Successive GATT rounds have substantially reduced tariff barriers to trade, and capital markets have also been liberalized, especially during the 1980s. Many business services have become internationally tradeable. As transaction and communication costs fall, the proximity between sellers and buyers, which has traditionally been considered to be essential for many services, figures less prominently. Most important in this regard is that financial capital has gone global. Nowadays, the financial centres of the world economy provide the possibility for 24 hour trading in all sorts of financial assets. The deregulation of other business services such as banking and insurance also offers new opportunities for the tradeability of services. Hence, standardized business services have become available around the world, which, in turn, has made the international fragmentation of production feasible. As a consequence of all this, not only the constraints on firms, but also on governments have completely changed.

Globalization shapes the world economy in different ways. Most obviously, international trade and capital flows are affected. Over the last 30 years or so, international trade has grown faster on average than production [GATT a], implying a more integrated world economy. Closer integration brings about opportunities for specialization, and hence increases interdependencies. This is highlighted by changes in the structure of world trade. For example, international sourcing, i.e. the purchase of intermediate inputs from foreign sources, has grown faster than domestic sourcing and now accounts for about half of all imports by major countries [OECD 1994d]; intra-industry trade has risen significantly in almost all OECD countries, and also between Japan and its Asian neighbours in physical and human capital intensive products, while intra-firm trade seems to have kept pace with the increase in total trade [Nunnenkamp et al. 1994].

In contrast to relatively steady changes in the pattern of international trade, especially during the last decade, a dramatic increase in the international redistribution of ownership has taken place. Flows of foreign direct investment (FDI), for instance, have grown even three to four times faster than international trade (Figure 1). In addition to rising FDI flows, other forms of international inter-firm cooperation such as licensing, joint ventures, offshore processing, minority participations, and so-called strategic alliances have become more important in recent years. As a rough approximation, the number of international inter-firm cooperation agreements has doubled over the 1980s [OECD 1994d]. These cooperation agreements tend to involve large firms from Europe, the United States, and Japan, and they are concentrated in sectors such as electronics, aerospace, telecommunications, computers and automobiles.

Figure 1. World FDI[a] and Trade[b] Flows, 1982-1993 (1982 = 100)



[a]Total FDI outflows. - [b]World merchandise exports plus exports of commercial services.
Source: IMF [a], GATT [a].

Although all three aspects of globalization - international trade, FDI, and international inter-firm cooperation - are dominated by OECD countries so far, the dynamic East and South-East Asian economies are rapidly becoming involved, as are some countries in Latin America and in Central and Eastern Europe. Given its current move towards economic reform, India may be the next giant eagerly waiting to join the globalization club. Those DCs which have joined already appear to have two things in common, despite rather dramatic differences in *per capita* income:[3/] a domestic economic policy which is compatible with integration into world markets, and a large supply of workers who have received at least a minimum amount of formal education at school. Improvements in formal education, i.e. increases in the average years of schooling, enable workers in DCs to compete with low- and medium-skilled workers in rich countries, provided that governments do not hinder international trade and capital flows. No wonder public debate considers globalization mainly as a threat to labour markets in industrialized countries. Consequently, recent economic studies focus on the implications of globalization for earnings and employment prospects of low-skilled workers in rich countries [Lawrence, Slaughter 1993; Nunnenkamp et al. 1994; Wood 1994]. The implications of globalization for DCs, however, have so far largely escaped the attention of the profession.

3/ Measured at purchasing power parity estimates [World Bank, 1994c], the P.R. China and India, for example, displayed about 20 and 15 per cent of the Republic of Korea GNP per capita. This difference is much larger than the largest difference within the OECD countries including Mexico, which is poorer than the Republic of Korea.

In the following, we try to change this unsatisfactory state of affairs. We portray the ongoing process of globalization involving DCs, and discuss why the gains from globalization are unevenly distributed among DCs up to now. Chapter B reviews the rationale behind different globalization strategies which are relevant with respect to DCs. Chapter C presents an overview of recent trends in international business cooperation through non-equity inter-firm alliances and FDI in DCs. Chapter D examines the implications of globalization for selected industries in DCs. Chapter E tries to assess the future position of DCs in the global economy, thereby highlighting the determinants for attracting foreign risk capital, the role of new technologies, and the risks involved in current policy trends in industrialized countries. Chapter F summarizes the main findings.

II. MAJOR FORMS OF GLOBALIZATION[4/]

Globalization proceeds through different means. What they have in common is some kind of international inter-firm cooperation, usually involving cross-border flows of technology, goods, capital, or intangible assets, or combinations of these. The specific instrument chosen for participation in worldwide production, sourcing and marketing depends on a number of country-, industry-, and firm size-specific characteristics. The whole spectrum of possibilities from which firms can choose for going global ranges from traditional arm's length trade to FDI. In the former, international inter-firm cooperation is restricted to conventional forms of selling and buying goods or services, without any changes in the respective ownership of firms. In the latter, ownership is redistributed internationally, typically through exchanges of majority equity stakes. In between these two extremes lies a grey area where so-called non-equity forms of cooperation (NEC) dominate alliances between domestic and foreign firms.

NEC covers a broad and heterogeneous range of cross-border activities of companies. They include in particular: R&D cooperation; joint ventures with minor foreign equity stakes; the supply of technology or trademarks through licensing agreements; production sharing arrangements, international subcontracting that involves firms with a local majority stake; as well as contracts on franchising and turnkey projects. The common denominator of the various types of NEC is that tangible or intangible assets are supplied by a foreign company to a local enterprise, while local interests in the host country retain majority or full ownership. The foreign company's equity stake, if any, does not constitute ownership control, though NEC may entail a significant degree of effective control by other means.

It should be noted that there is no unanimous border line of foreign equity holding that would adequately serve to distinguish NEC from FDI [see also IMF b, pp. 136 ff.]. The relevant criterion for FDI is that the foreign investor has an effective voice in the management of an enterprise. Yet effective control does not only depend on the proportion of foreign equity holdings, but also on whether the remaining shares are widely dispersed or rather concentrated. The information required for clear-cut differentiation between FDI and NEC is generally not available. Consequently, there is no alternative but to refer to the proportion of foreign ownership in defining FDI. The

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4/ This section draws on Nunnenkamp et al. [1994, Chapter III].

border line applied differs considerably between different sources. In balance of payments statistics, the percentage chosen is typically quite low, ranging from 25 per cent down to 10 per cent.

Furthermore, the relation between NEC and FDI is not straightforward from an analytical point of view. The ambiguities are similar to those evident in the trade-FDI nexus and largely stem from economic policy interventions. The positive effect of past and present exports on FDI, postulated by the theory of optimal timing of FDI, may be neutralized if large and important markets are not accessible via exports and FDI is undertaken to overcome protectionist trade barriers. Trade liberalization may then have even a negative effect on FDI. Similarly, NEC may be a second-best alternative to FDI if the latter is regulated or even prohibited. Globalization through NEC might then become less relevant once detriments to FDI are removed.

Substitution effects between NEC and FDI (as well as trade and FDI) reflect that corporate strategies and government regulations are intertwined. Until the early 1980s, many countries were concerned about "foreign dominance" by transnational corporations (TNCs) in their economies. Especially in DCs, globalization through FDI was hindered by a host of restrictions, ranging from the closure of strategic industries to foreign equity investment to performance requirements in terms of local content and export obligations.[5/] Such a restrictive policy stance left no alternative but to globalize via NEC, or at least increased the attractiveness of NEC relative to FDI. At the same time, recourse to NEC suggests that entrepreneurial adaptation to policy interventions reduced the effectiveness of the latter in achieving the host country's objective to limit foreign involvement in the economy. Given that NEC, too, involved effective control by foreign companies, majority ownership by the host countries was insufficient to guarantee exclusive local control.

The limited effectiveness of government regulations may have contributed to the more liberal stance towards FDI since the 1980s.[6/] In many DCs, however, the significant relaxation of FDI restrictions was an attempt to overcome foreign exchange constraints and to improve the chances of a closer integration into the world economy. Even if higher FDI inflows were induced by such a move, the effectiveness of the policy change may again suffer from substitution effects. A rise in FDI would then go hand in hand with less globalization through NEC; if so, an earlier rise in NEC would turn out to be temporary.

Policy-induced substitution effects notwithstanding, the degree of globalization is likely to be underestimated when NEC is ignored. Two factors are of particular relevance with respect to the growth of NEC: (i) general changes in TNC perceptions of the advantages of NEC, which are of a longer-term nature and independent of policy-induced biases in corporate decision making, and (ii) industry characteristics that have as a consequence that NEC is the superior way of globalization in certain sectors, while there may be no alternative to FDI in other sectors.

5/ For an overview on the types and coverage of regulations in selected DCs, see Agarwal et al. [1991] and the literature given there.

6/ For empirical evidence on FDI liberalization, see ERT [1993] and UNCTC [a].

While FDI provides a way for the host country to share economic risks with foreign investors, TNCs may aim at risk diversification by unravelling the FDI package. NEC offers various options to this effect. Political risks in general, and expropriation risks in particular, can be contained in the case of joint ventures with local majority stakes. By providing intangible assets through licensing, investment and operation costs are shifted to local or other foreign partners. Subcontracting implies that the effects of fluctuations in final demand are shared with the subcontracting firm in the host country. Financial risks can be diversified by delegating the financing of investment projects to commercial banks.

The favourable risk properties of NEC render it easier for newcomers to go global, especially in the case of smaller companies for which the potential of intra-firm diversification of risks is limited.[7/] For these companies, NEC offers the opportunity to compete with established TNCs in world markets, despite an internationally less diversified equity structure. As a consequence, more FDI by market leaders is likely to provoke more NEC by market followers. FDI and NEC can thus be expected to be complements rather than substitutes.

Industry characteristics can also explain why different corporate globalization strategies are followed at the same time. It is well known from the eclectic theory of FDI [Dunning 1977] that owners of intangible assets prefer to maintain control over the use of such assets, if external markets are inefficient and the transfer of assets through market exchange involves high transaction costs. Hence, it can reasonably be assumed that the suitability of different globalization strategies depends on the asset-specific significance of market imperfections and transaction costs. For example, market inefficiencies are supposed to have an impact in the case of ownership advantages related to products and marketing so that internalization is most likely to occur through FDI [Kumar 1989]. As concerns ownership advantages related to process technology, the propensity to FDI is expected to be relatively high in the case of innovative technologies, whose management requires particular skills of the owner's employees. By contrast, licensing is expected to be a prime vehicle of globalization if standardization is well advanced [Caves 1974; Teece 1981].

The importance of intangible assets related to products and markets, and the technologies applied vary across industries. Hence, the propensity to internalize and the preferred mode of internalization will be industry-specific [Dunning 1981; Kumar 1989]. Globalization may be dominated by FDI in industries producing differentiated goods, for the sale of which brand names and quality control feature prominently. The same applies when globalization necessitates the transfer of highly skilled personnel, for example, for the purpose of management and organization, marketing, and R&D. By contrast, NEC may be favoured in industries where knowledge is embodied in capital goods, production processes do not require extensive supervision, and the R&D intensity of production is low.

7/ See also Contractor, Lorange [1988, pp. 14-15]; Oman [1989, p. 15] argues that newcomer TNCs based in Japan, Europe and DCs tended to favour NEC.

Finally, country characteristics may shape globalization strategies. DCs may prefer FDI in some industries and NEC in others. Many DCs have built up considerable domestic capacities in management, technological development, and marketing. Depending on the advances made in these areas, they may rely on local resources to the largest extent possible in order to reduce foreign exchange costs [Oman 1989]. Consequently, they will prefer NEC in industries that can be run locally once specific assets are supplied from abroad, for example through licensing. By contrast, the package of foreign assets typically embodied in FDI will be welcomed particularly in industries where the bundle of necessary inputs is generally not available locally.

III. OVERVIEW OF RECENT TRENDS IN INTERNATIONAL BUSINESS COOPERATION

A. Empirical Evidence on Non-Equity Cooperation with Developing Countries

Any empirical assessment of the significance of NEC and its relation to FDI suffers from serious data shortcomings. This is all the more so in the case of DCs. In contrast to the comprehensive, though not always consistent data collection on FDI, the available statistical information on NEC is fragmentary and incomplete, especially with respect to DCs. Contractual arrangements between companies of different legislations largely escape balance of payments statistics. The flow of goods, services and income induced by such arrangements is typically hard to identify, as the relevant items are included in more broadly defined statistical categories. Finally, FDI and NEC are sometimes difficult to disentangle.

Notwithstanding the lack of comprehensive data on NEC, there appears to be a fairly broad consensus that globalization has not only been pursued via FDI but also through various forms of collaborative ventures.[8/] Some empirical support for this view comes from the Maastricht Economic Research Institute on Innovation and Technology (MERIT), which runs a data base on more than 10,000 ventures [Hagedoorn, Schakenraad 1990, Appendix I].

This source basically relies on newspaper reports on business events. Two obvious limitations are that deals between small and medium sized firms (SMEs) are more likely to go unrecorded, and that dissolution agreements are unlikely to be published. A selection bias also results from the fact that the MERIT data base only includes inter-firm agreements that contain some arrangements for transferring technology or cooperating in research; mere production or marketing joint ventures are not taken into account. Furthermore, although partnerships involving majority ownership are explicitly excluded, some cases may include equity participation large enough to qualify as FDI. These shortcomings notwithstanding, the MERIT data base provides the most comprehensive systematic stocktaking of international inter-firm cooperation agreements up to now.

8/ See, for example, Business International Corp. [1987]; Hergert, Morris [1988]; Oman [1989]; Dicken [1992]; The Economist [1993].

The MERIT data reveal that the most commonly cited reasons for inter-firm cooperation agreements which involve some form of technology transfer were to gain access to a market, to exploit complementary technologies and to reduce the time required for innovation. Taken together, these motives account for more than 80 per cent of all cases considered. It is interesting to note, however, that basic R&D is rarely found to be a subject of cooperation, as it only accounts for 4 per cent of all alliances reported. This is probably because basic R&D concerns the core activity of companies, and one which they are reluctant to share with other independent firms. This finding supports the above proposition that different globalization strategies are complementary to each other, the mode of globalization depending on the importance and specificity of particular corporate assets and the asset-specific transaction costs involved.

As expected, the relative importance of different motives for entering into inter-firm cooperation agreements varies between sectors. Technological complementarity and reduced innovation periods are less relevant in motivating cooperation in mature industries. The latter comprise chemicals, consumer electronics, food and, to a certain extent, also the automobile industry, and together account for 17 per cent of the total number of alliances. Market-related motivations dominate in these industries. By contrast, technology-related motivations dominate in biotechnology, new materials, industrial automation and software, and partly also in aviation. However, alliances with respect to basic R&D activities are of minor relevance in most of these sectors, too. This suggests that even for those alliances which aim at some sort of technology transfer, inter-firm cooperation is not the preferred globalization strategy when it comes to highly firm-specific assets and the core activities of companies. In these cases, FDI seems to dominate.

This general picture gives some clues as to the expected empirical pattern of inter-firm technology partnering between industrialized countries and DCs. If, as suggested by the MERIT data base, more than half of all inter-firm technology partnerships can be explained by the motives "reducing innovation time" and "searching for technological complementarities", cooperation in this area can be expected to be largely a game between equally advanced players with a similar level of technological capabilities. Inter-firm technology partnering within the Triad (Europe, The United States and Japan) will then dominate, especially in technologically advanced sectors where the above mentioned motives have a still higher weight. Cooperation between firms from the Triad and DCs would not provide the required match of partners involved and is, thus, rather unlikely in this area. If at all, Triad-DC technological cooperation should have a role to play in more mature sectors, for which market-related motives have a larger weight. It must be recalled, however, that the MERIT data base displays a sample selection bias as it only considers inter-firm cooperation agreements which involve some transfer of technology: While it does make sense to expect a transfer of technology between rich and poor countries, a priori it is not clear why this transfer should proceed through inter-firm cooperation, rather than through FDI which would allow the investing partner to maintain control over the technology transferred.

In analysing patterns in international inter-firm technology partnering, Freeman and Hagedoorn [1994] differentiate between what they call "strategic technology partnering" and "inter-firm technology transfers". The first category subsumes agreements such as

joint R&D and other innovative activities, while the latter includes agreements whereby one company provides access to its technology to another company, with licensing agreements as a leading example.

The international distribution of strategic technology alliances in 1980-1989 is shown in Table 1. These alliances are further classified by mode of cooperation, and by field of technology. Taken at face value, the overall numbers indicate an extremely high concentration of strategic technology partnerships among industrialized countries. Over 95 per cent of the strategic technology alliances have been established between companies from industrialized countries, and just 2.3 per cent between a Triad company and a firm from one of the newly industrializing economies (NIEs); a meagre 1.5 per cent cover alliances between Triad companies and companies from least developed countries (LDCs). While the involvement of DCs, notably LDCs, in strategic technology partnering is generally small, some additional information can be gained from the structure of international strategic alliances.

Table 1. International Distribution of Strategic Technology Alliances, 1980-1989

	Number of alliances	Share of (percent):		
		Developed economies	Triad-NIEs	Triad-LDCs
Total	4192	95.7	2.3	1.5
By mode of cooperation:				
Joint R&D	1752 (41.8 %)	99.1	0.5	0.4
Joint ventures	1224 (29.2 %)	90.9	4.9	3.4
Minority investments	684 (16.3 %)	95.8	2.0	0.1
R&D contracts etc.	532 (12.7 %)	96.6	2.6	0.2
By field of technology:				
Biotechnology	846 (20.2 %)	99.1	0.4	0.1
Medical	95 (2.3 %)	100.0	0	0
Computer	199 (4.7 %)	98.0	1.5	0.5
Software	346 (8.3%)	99.1	0.6	0.3
Automotive	205 (4.9 %)	84.9	9.8	5.4
Chemical	410 (9.8 %)	87.6	3.9	7.1
Microelectronics	387 (9.2 %)	95.9	3.6	0
Misc. information	148 (3.5 %)	93.3	5.4	0.7
Food and beverages	42 (1.0 %)	90.5	9.5	0

Source: Based on Freeman, Hagedoorn [1994].

First, considering the mode of cooperation, the relative importance of strategic alliances for firms in DCs is largest in the category "joint ventures", which is defined as including a number of corporate objectives other than R&D. By contrast, the weight of DCs is extremely low with regard to joint R&D activities. This is almost so by definition, considering the less advanced technological capabilities of DC partners. As argued above, their marginal involvement in joint R&D does not imply that DCs are delinked from technology transfers. Rather, strategic alliances are largely irrelevant in this respect.

Second, the classification by field of technology indicates that the observed pattern is influenced by the technological intensity of sectors. Strategic alliances within the Triad strongly dominate in high-tech sectors such as biotechnology, medical technology, computers and software. There is a larger role for strategic alliances involving DCs in relatively mature fields such as automotive technology, chemicals (the only case in which Triad-LDC alliances are more numerous than Triad-NIE alliances), microelectronics, and food and beverages. Firms from Asian NIEs figure most prominently on the side of DCs.

Not surprisingly, a similar pattern re-emerges from the analysis of inter-firm technology transfer agreements, derived from a smaller sample of 1700 cooperative ventures. In the definition used by MERIT, technology transfers mainly include licensing agreements, technology sharing agreements, and joint ventures with a licensing agreement. Again, inter-firm cooperation within the Triad dominates the sample, although to a somewhat lesser extent than in the case of strategic alliances. About 90 per cent of all technology transfer agreements registered are between industrialized countries. Triad-NIE technology transfers account for about 6 per cent, and Triad-LDC deals for about 4 per cent. With regard to the sectoral distribution, the pattern found for strategic alliances is repeated by and large. However, substantial shares of technology transfer agreements between firms from the Triad and Asian NIEs are reported for automotive technology and microelectronics (about 20 per cent) as well as consumer electronics (about 10 per cent) [Freeman, Hagedoorn 1994]. The somewhat larger weight of DCs, and especially the considerable involvement of Asian NIEs, confirms a priori expectations. Inter-firm technology transfers, as defined by MERIT, are much less R&D intensive than strategic alliances. Accordingly, cooperation between partners at different stages of technological development seems to be a more reasonable alternative to FDI in this category.

Two examples of technologically motivated alliances illustrate some characteristics of technology cooperation between Triad and DC firms [San 1992], namely the joint venture between Taiwan's Acer Group and Texas Instruments in the field of information technology, and alliances between government- backed firms in Taiwan Province (NDL and IIS) and IBM in the software industry. In both cases, the aim was to upgrade the technological capabilities of Taiwanese firms, and to improve their marketing in domestic and foreign markets. The experience of Taiwan Province suggests that strategic alliances with foreign partners are more likely to be established by larger and more capital intensive enterprises. Hence, differences in factor endowments could be another reason for the rather limited evidence of technology partnerships between Triad and DC firms, considering that enterprises in DCs are generally less capital-intensive than in industrialized countries.

Tentative empirical evidence on the structure of Triad-DC business alliances which do not exclusively focus on the transfer of technology, may be derived from a 1991 survey of Canadian industrial and merchandising companies. These companies had established alliances with firms in eight countries in East and South-East Asia [Hung 1991; 1992] (Table 2). As can be expected for cooperation between unequal partners, more than two-thirds of the business alliances were market oriented, i.e. the underlying motive of Canadian firms was to gain access to local markets. Production and technology oriented alliances taken together only accounted for about one fifth of all cases. The figures also indicate that relatively advanced DCs have better chances of participating in business alliances: in every category, NIEs are involved more frequently than other DCs. Put differently, the division of labour between unequal partners is more likely to proceed through instruments other than NEC.

Selective evidence, dating back to the mid-1980s, on business alliances between firms from India and the US confirms the predominance of market-oriented motives, rather than technology cooperation [Parvatiyar, Gupta 1994]. The main reason for US firms engaging in India was to establish a production base in the large Indian market. Apparently, the choice of instruments was influenced by government regulations. Indian firms were allowed to collaborate with foreign enterprises in three basic ways: licensing of technology without equity participation, joint ventures with foreign equity capital, and outright purchase of technical know-how in the form of design and drawings. Other forms of international cooperation (such as franchising and production sharing) were rarely permitted by the Indian government. Outstanding examples of joint ventures included: India's Tata Steel and Timken, a US producer of bearings; India's Modi Group and Xerox in the area of office automation; and Composite Tools, a joint venture between a US firm (Precision Carbide Tools) and an Indian entrepreneur, which was unique in the sense that the partners were aiming exclusively at exports. In essence, all examples represent marketing alliances, with US product technology and market experience complementing the relatively cheap manpower available in India.

Table 2. Distribution of Canadian Inter-firm Alliances with Partners in Asian DCs, 1991

Type of agreement	Number of alliances	Share of (percent):	
		NIEs[a]	Other DCs[b]
Technology oriented[c]	30 (15.9 %)	56.7	43.3
Production oriented[d]	12 (6.3 %)	58.3	41.7
Market oriented[e]	128 (67.7 %)	59.4	40.6
Others	19 (10.1 %)	52.6	47.4
Total	189	58.2	41.8

[a]Hong Kong, Singapore, Rep. of Korea , Taiwan. - [b]Indonesia, Malaysia, Philippines, Thailand. - [c]Collaborative research, technology transfer, licensing. - [d]Contract manufacturing. - [e]Market development, local distribution.

Source: Based on Hung [1991; 1992].

Past research on globalization has focused on large TNCs. Yet there seems to be a role for smaller firms in international markets, and in international investment. The opportunities for smaller firms are simply different from those for larger TNCs. Because of their limited and specialized resources, SMEs may be best advised to compete in niche markets in which margins are higher, but economies of scale and scope are less important. Their activities are often less spectacular and, therefore, receive less publicity than TNC activities.

A recent study on inter-firm cooperation strategies of Canadian SMEs in the Asian-Pacific region [Dhingra 1991] revealed that these firms do not systematically behave differently from the average firm from the MERIT data base. First, it was found that Canadian SMEs display a relatively high tendency to enter the markets of developed or newly industrializing countries, both by equity joint ventures and non-equity contractual alliances, rather than markets of less advanced DCs in the Pacific Rim. Strategic alliances of SMEs in high-tech areas (aircraft, computers, etc.) are more concentrated in industrialized countries; alliances in rather traditional and mature industries are more localized in DCs. Second, many of the non-equity alliances were concluded in capital goods industries; equity joint ventures prevail in industries like electrical equipment, electronics, and mining and forestry. Third, most non-equity alliances of Canadian SMEs were found to be related to marketing contracts, which is in accordance with the general pattern of Canadian inter-firm cooperation in Asia [Hung 1991; 1992]. Fourth, the smaller the firm, the more likely seems to be the recourse to NEC as compared to FDI.

The selective empirical evidence on NEC does not allow far-reaching conclusions, particularly as concerns the involvement of DCs in inter-firm cooperation. The tentative pattern of international business alliances emerging from various sources suggests, however, that the respective factor endowments of cooperation partners play a significant role, in addition to government regulations and presumed market inefficiencies. In high-tech sectors, strategic alliances are mainly motivated by technology cooperation. Triad-DC partnerships do not figure prominently here, as a lower degree of technological capability is just one of the constituent properties of DCs. Although conclusive cross-country evidence does not exist, business partnerships with DC firms seem to be more important when it comes to standardized production and, especially, to market oriented cooperation. Taken together, technology appears to be transferred to DCs mainly by means other than NEC, namely by international capital flows.

2. The Attractiveness of Developing Countries for Foreign Capital

The focus in this section is on FDI which, as mentioned earlier, is the most obvious (and relatively well documented) indication of a country's locational attractiveness in the era of globalization. A first and rather simple test of whether DCs have become more integrated into the world economy is presented in Table 3.[9/] The globalization hypothesis implies that the significance of trade and capital flows should increase for countries successfully participating in the more elaborate international division of labour.

9/ If not mentioned otherwise, in the following, DCs comprise reporting countries of the Debtor Reporting System [World Bank 1994b]. This includes transition economies in Central and Eastern Europe.

Specifically, exports should grow faster than production (proxied by GNP), and FDI inflows should grow faster than exports.[10/] The export-to-GNP ratio (since 1987) and the FDI-to-export ratio did indeed increase for the aggregate of all DCs.[11/] Booming FDI flows to DCs caused a tenfold rise in the latter ratio since 1980, while the increase of the former was rather moderate. However, the average development for all DCs obscures remarkable differences between various country groups.[12/]

Table 3. The Integration of Selected DC Regions into the World Economy, 1980-1994

	Exports in percent of GNP					FDI inflows (net) in percent of exports				
	1980	1987	1990	1992	1994[a]	1980	1987	1990	1992	1994[a]
All DCs	30.3	20.5	21.2	22.6	24.4	0.7	2.1	2.8	4.6	6.7
East Asia and Pacific	23.2	26.5	27.8	30.4	32.2	1.3	2.7	4.4	6.4	10.2
South Asia	10.8	9.9	10.9	13.5	17.0	0.8	1.3	1.4	1.4	1.4
Latin America and Caribbean	18.1	17.5	17.0	16.2	14.6	4.8	4.6	4.4	7.0	8.5
Middle East and North Africa	50.7	25.4	34.9	29.4	37.8	-1.5	1.0	1.0	1.1	1.5
Sub-Saharan Africa	33.6	29.7	31.9	30.0	32.5	0.0	2.2	1.0	2.2	2.7
East Europe and Central Asia	–[b]	–[b]	14.0	17.2	13.7	0.0	0.0	0.2	3.1	7.4

[a]Projected. – [b]Not reported because of unreliable GNP data.

Source: World Bank [1994b].

Both indicators show that it is mainly East Asia which has become more integrated into the international division of labour. This region stands out in two respects: (i) it is the only one for which export growth surpassed production growth significantly over the whole period under consideration; (ii) the FDI-to-export ratio reveals a record increase (9 percentage points) and is now higher than in Latin America, which was the traditionally preferred investment location of US and European TNCs. East Asia's integration into the world economy proceeded along with domestic liberalization. ASEAN countries, China, the Republic of Korea and Taiwan Province relaxed FDI restrictions, notably since the mid-1980s [Chen 1993; ADB 1990].[13/] Greater openness

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10/ See Section A. Similarly, Bhagwati [1995] characterizes the greater internationalization of markets by rising trade-to-GNP ratios, a greater role of TNCs, and increased integration of world capital markets.

11/ The temporary decline of the export-to-GNP ratio in the early 1980s is due to the drastic fall of oil prices after the 1980-peak. Consequently, nominal exports of oil exporting countries in 1987 were less than half the 1980-value.

12/ The comparison of the export-to-GNP ratio across country groups is not meaningful because it tends to be systematically lower for large economies. Hence, the interpretation of this ratio is restricted to its development over time.

13/ For example, sectors previously considered "sensitive" were opened to FDI and restrictions on profit remittances were removed. As a result, FDI policies of East Asian economies converged at a lower regulatory level.

was obviously a precondition for booming FDI. At the same time, various East Asian economies reformed their trade regime [Langhammer 1995; Riedel 1991]: non-tariff barriers were replaced by tariffs, tariff escalation was reduced, and both tariffs and quantitative import restrictions were dismantled unilaterally. Import liberalization encouraged specialization in line with to world market prices and rendered export expansion sustainable.[14/]

The integration of other DC groups into the world economy is less advanced, and this may hinder their chances of benefitting from globalization trends. In Sub-Saharan Africa, the export-to-GNP ratio stagnated over the whole period under consideration and the FDI-to-export ratio has remained fairly low. The latter is also true for South Asia and the Middle East (including North Africa). It cannot be concluded from all this, however, that globalization works against DCs except for East Asia. Developments over the past 15 years are ambiguous in the case of Latin America. On the one hand, the export-to-GNP ratio is still on the decline, which may indicate that trade policy reforms have remained insufficient to establish closer trade links with the rest of the world. On the other hand, the earlier erosion of the region's attractiveness for FDI was reversed in the early 1990s. This suggests that locations in Latin America resumed their role in the sourcing and marketing strategies of TNCs as a result of macroeconomic stabilization and liberalization becoming firmly rooted in major host countries. The renewed interest of foreign investors in the region offers favourable prospects for closer integration into world trade as well, considering that FDI and trade flows are typically positively correlated [Nunnenkamp et al. 1994]. Likewise, the soaring FDI-to-export ratio in Eastern Europe and Central Asia in the early 1990s supports the proposition that latecomers may join the ranks and participate in globalization, once deliberate isolation is replaced by world-market-oriented economic policies.

East Asia's outstanding position among DCs in terms of attractiveness for foreign capital is also reflected by the development of net resource inflows and changes in their structure (Figure 2).[15/] The share of this region in total net resource flows to all DCs has grown from 15 per cent in 1980 to 40 per cent in 1994 [World Bank 1994b]. The relative gain in attractiveness was largely at the expense of Latin America, whose share in total net resource inflows went down from one third in 1980 to less than one-fifth in 1994. However, the comparison of these two years may lead to wrong conclusions with regard to this region's attractiveness to foreign capital, unless developments in the interim are taken into account. Net resource flows to Latin America dwindled to about US$ 8 billion in 1989, but recovered quickly thereafter. In 1993/94, they averaged US$ 53 billion, i.e. nearly 180 per cent of inflows in 1980.

14/ The role of import liberalization in preventing a policy-induced anti-export bias became more important recently [Agarwal et al. 1995]. It was increasingly difficult to compensate implicit export taxes resulting from import substitution policies by direct export promotion measures. In particular export subsidies provoked retaliation by trading partners, and are to be phased out under the new WTO rules.

15/ According to World Bank definitions, net resource flows comprise net flows of long-term debt, net FDI, portfolio equity flows and grants (excluding technical cooperation grants).

Figure 2. Structure of Capital Inflows, 1980 and 1994

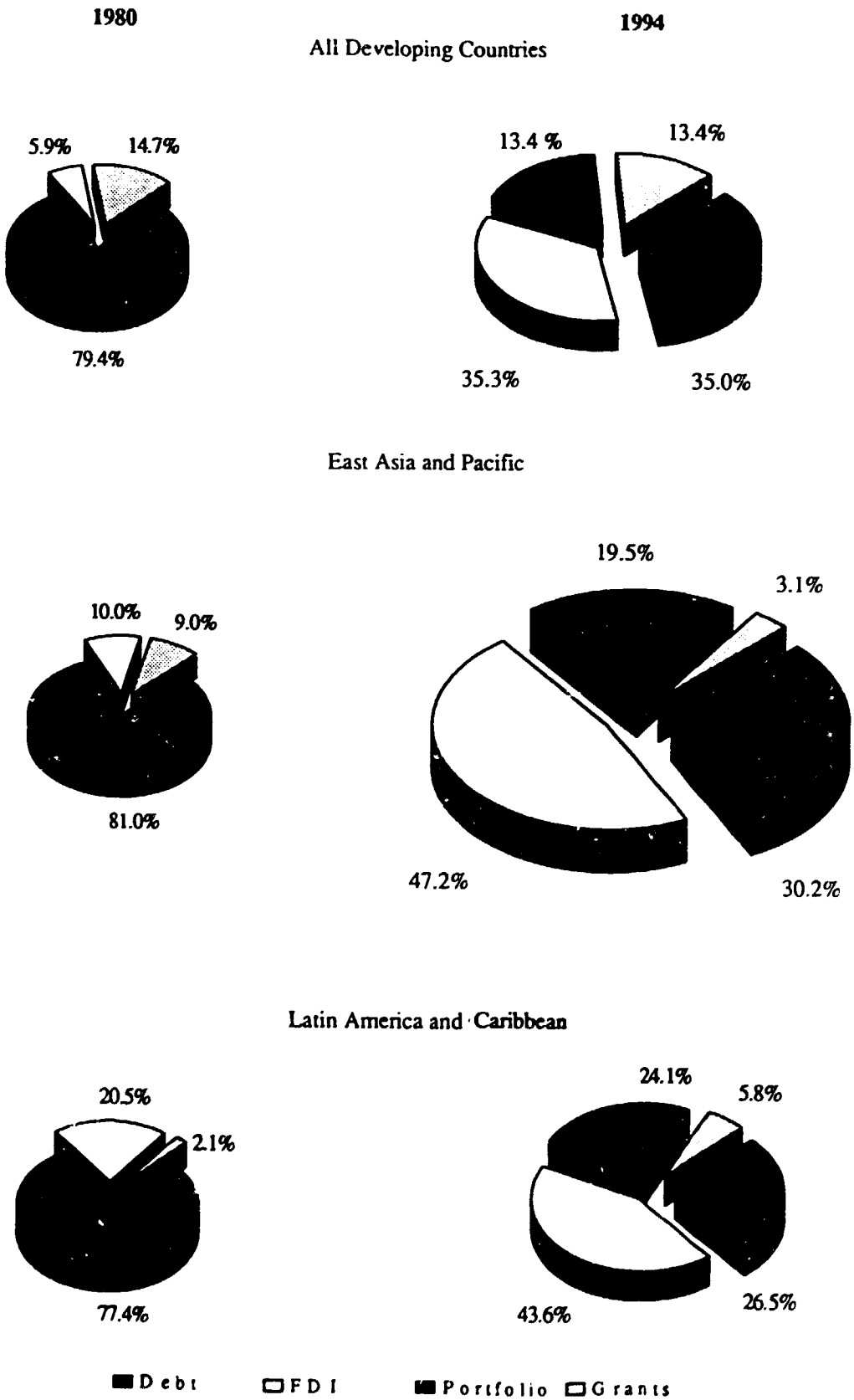
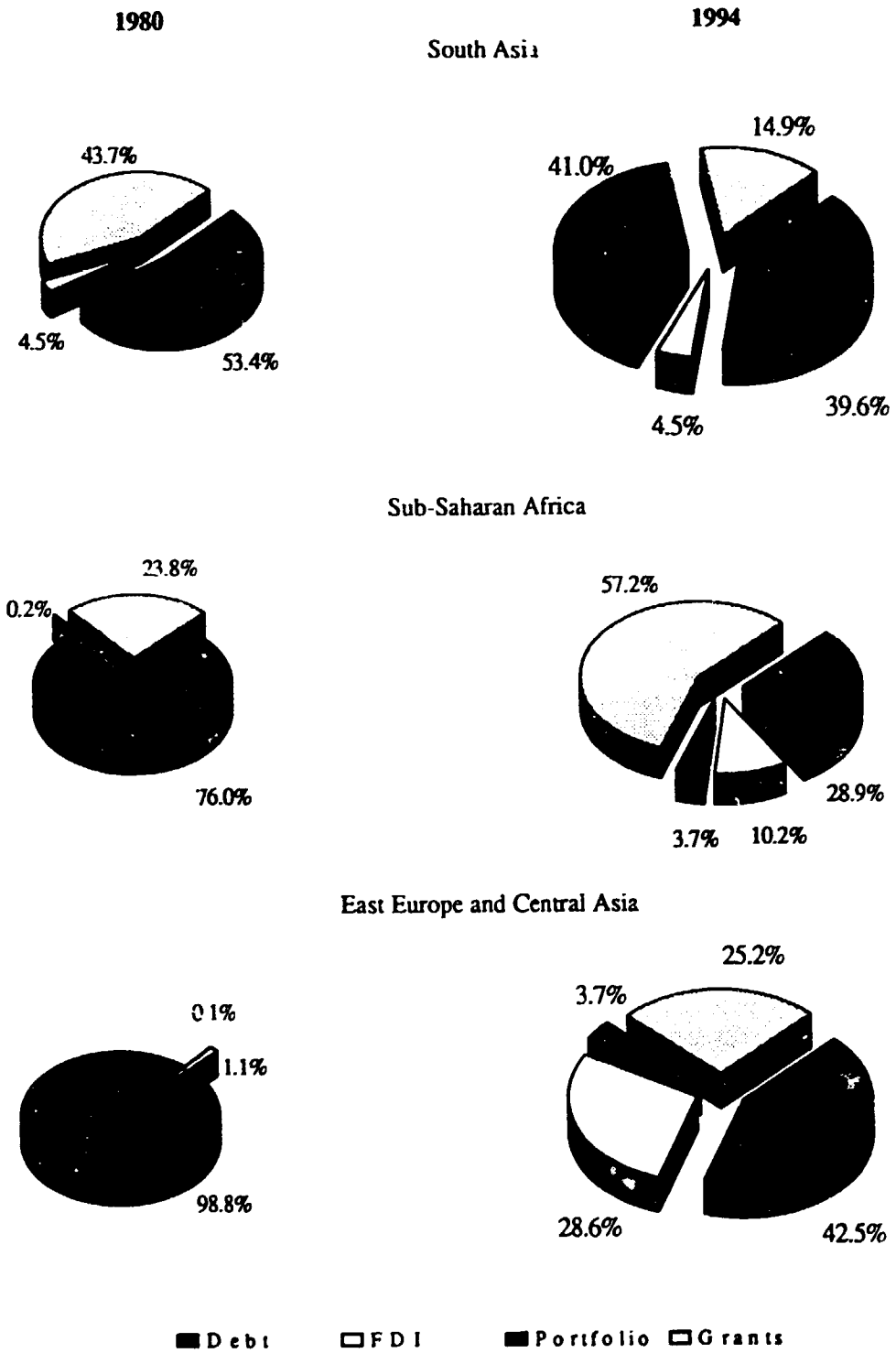


Figure 2. continued



[a]Percent of total net resource inflows. Debt refers to net flows of long-term debt. 1994 - figures are World Bank projections. Middle East and North Africa not considered because of negative (net) FDI inflows in 1980.

Source: World Bank [1994b].

As concerns the structure of net resource inflows, various DC groups have in common that debt inflows, which had accounted for the bulk of total inflows in 1980, decreased dramatically in importance. If this shift were to be attributed to the debt crises in Latin America and Africa exclusively, it should have been less pronounced for regions without serious debt problems such as East Asia. This is not the case, however. In both Latin America and East Asia, FDI and portfolio equity flows accounted for two-thirds of total net resource inflows in 1994. It appears, therefore, that structural changes in the external financing of many DCs are associated with changes in the behaviour of foreign investors under conditions of globalization and less restrictive attitudes of host countries towards equity capital inflows. Yet, the situation of Sub-Saharan Africa indicates that liberalizing the inflow of equity capital is not sufficient to induce a shift from debt to equity capital.[16/] Rather, the dependence of this region on external grants has gained further momentum. The risk of being delinked from the globalization strategies of TNCs appears to be particularly high for those Sub-Saharan African economies in which investment conditions remain subject to political uncertainty and economic instability.[17/]

As already indicated, in recent years portfolio investment has accounted for a significant share of total net resource flows to many DCs. This applies primarily to the relatively advanced economies in Latin America and East Asia (see also Figure 3).[18/] The steep increase in portfolio investment, notably in the early 1990s, was rendered possible by the deregulation of domestic capital markets in many DCs.[19/] This provided international investors, e.g. Western pension funds, with better chances to diversify risks and derive profits in newly emerging capital markets. In contrast to FDI, however, the increased commitment of portfolio investors beyond traditional markets is not directly linked to the globalization of production. While portfolio equity flows may be transformed into productive investment, they may be of a rather speculative nature and are easily withdrawn if higher returns are offered elsewhere or risk perceptions change abruptly [UNCTAD 1995b]. Hence, portfolio investment tends to be more unstable than FDI. Its susceptibility to transient financial shocks is evident from the Mexican crisis of 1994/95. Indeed, the phenomenal growth of portfolio equity flows was sharply interrupted in 1994 (Figure 3). While the reduction remained marginal in East Asia (-3 per cent), inflows were down to 42 per cent of 1993-figures in Latin America.

Nonetheless, the growth of FDI in Latin America continued in 1994.[20/] This supports the view that FDI is less volatile than portfolio investment and involves a lasting commitment to the recipient economy [UNCTAD 1995b, p 3]. Among the various elements of foreign capital inflows, FDI therefore provides the best indicator of the position of DCs in the globalization strategies of TNCs.

16/ The regulatory framework for FDI has been liberalized in various African countries, for example, by simplifying administrative procedures, concluding bilateral investment protection and promotion treaties, and acceding to multilateral treaties [UNCTAD 1995a, pp. 24ff].

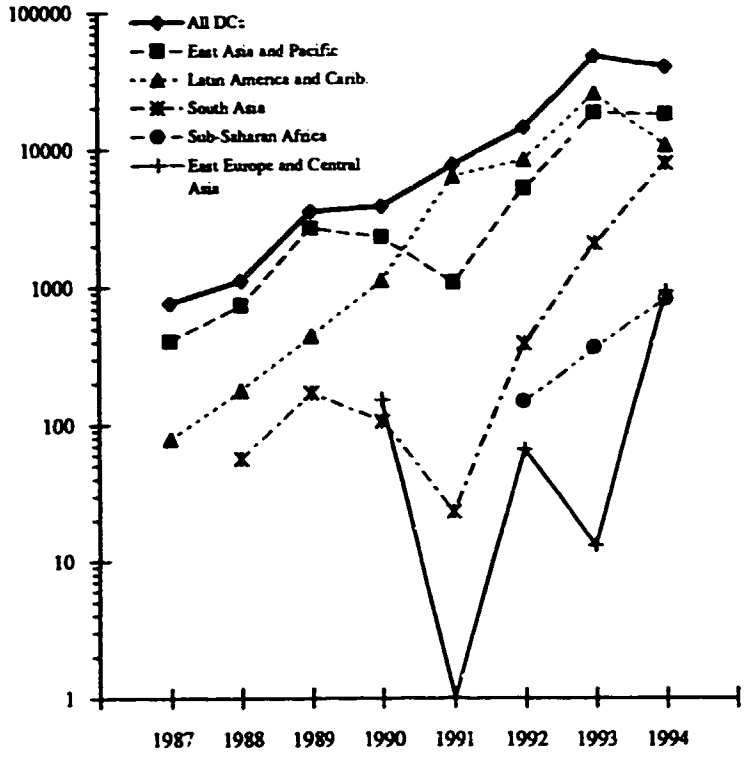
17/ For a recent analysis of the reform process in this region, see World Bank [1994a].

18/ Two factors must be considered in interpreting the extremely high share of portfolio investment in South Asia's net resource inflows in 1994 (Figure 2). First, the increase of portfolio equity flows is of a very recent nature. The 1992-share was still below 5 percent. Second, India received more than 90 percent of portfolio equity flows to the whole region in 1993 (country-specific data are not available for 1994) [World Bank 1994b].

19/ Access barriers were substantially lowered in East Asian countries, for example [for details, see Greenwood 1993]. Cases in point are the Republic of Korea and Taiwan Province, which had applied a fairly restrictive policy stance until the 1980s.

20/ The growth rate of 17 percent was about the same as in the two previous years [World Bank 1994b].

Figure 3. Portfolio Investment in Developing Countries, 1987 - 1994 (US$ million)



Source: World Bank [1994b].

DCs as a whole have made considerable progress recently in participating in globalization through FDI. According to UNCTAD data [1995a; 1995b], their share in worldwide FDI inflows averaged 32.3 per cent in 1991-1993. In 1993 and 1994, respectively, this share reached 39 per cent, nearly twice the average figure for the 1980-1990 period. Booming FDI had as a consequence that the ratio of FDI inflows to gross domestic capital formation increased from about 2 per cent in the mid-1980s to 4.9 per cent in 1992 [UNCTAD 1995b, Table 2].[21/]

Again, however, a regionally disaggregated presentation reveals significant differences between major DC groups. In West Asia, the extremely low ratio of FDI inflows to gross domestic capital formation remained more or less constant at about 0.5 per cent. By contrast, the ratio has increased by 4 percentage points in East, South and South-East Asia since 1985 (to 5.5 per cent in 1992).[22/] Other DC regions, notably Africa and Latin America, range between these two extremes, in terms of both the level and the

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21/ The 1992-ratio was 1.2 percentage points higher than the average ratio for developed countries during 1985-1992.

22/ The high ratio for this group is all the more remarkable as huge countries such as India are included. In line with the export-to-GNP ratio, the share of FDI in gross capital formation tends to be lower in large countries.

increase of the ratio This underscores the above contention that integration into the world economy progressed most rapidly in many Asian DCs.[23/]

Related to this are significant changes in the regional distribution of FDI flows to DCs (Figure 4). East Asia's share has nearly quadrupled since 1980. This rise is mainly due to China's emergence on world capital markets.[24/] TNCs grasped the chance to benefit from low-cost sourcing and the huge market potential, once China's integration into their globalization strategies was rendered possible by domestic liberalization. This does not imply, however, that neighbouring DCs were negatively affected. Rather, the contrary is true. FDI flows to East Asian DCs other than China increased by a factor of 8 from 1980 to 1993. Moreover, Chinese liberalization encouraged Asian TNCs, too, to globalize their production and marketing. In fact, the four Asian NIEs (Hong Kong, Singapore, the Republic of Korea and Taiwan Province) accounted for more than three-quarters of FDI stocks in China by mid-1993 [UNCTAD 1995a, Table 4; see also below].

Eastern Europe and Central Asia is the second most important region to have increased its share in total FDI flows. This recent development is obviously related to the progress achieved in economic transformation, notably in transition economies in Central and Eastern Europe. Latin America appears to be the main loser.

However, the regional share in total FDI flows tends to obscure factors relevant for assessing the position of Latin American economies in the context of globalization. First, the earlier stagnation of FDI inflows came to an end in the late 1980s. The projected 1994-figure of US$ 19 billion exceeded 1987-inflows by a factor of 3.3 [World Bank 1994b]. Second, several DCs in this region were among the best performers when FDI inflows in 1993 are compared with 1984.[25/] The top five DCs in terms of this ratio include Argentina, Mexico and Chile (as well as China and Morocco). The favourable position of Argentina and Mexico, in particular, indicates that attractiveness to FDI may be regained in the aftermath of major economic crises, once consistent domestic policy reforms (comprising macroeconomic stabilization and structural adjustment) are implemented. This is seen in reverse form in Brazil: this less reform-minded country lost its top position with regard to FDI inflows in 1984, and was overtaken by 10 of the 25 DCs under consideration.[26/]

Overall, the evidence for major DC recipients of FDI in 1984 puts into perspective the widespread belief that only a few DCs may benefit from globalization. Underlying this belief is the observation that between two-thirds and three-quarters of total FDI flows to DCs have consistently been absorbed by the ten largest host economies [see, e.g.,

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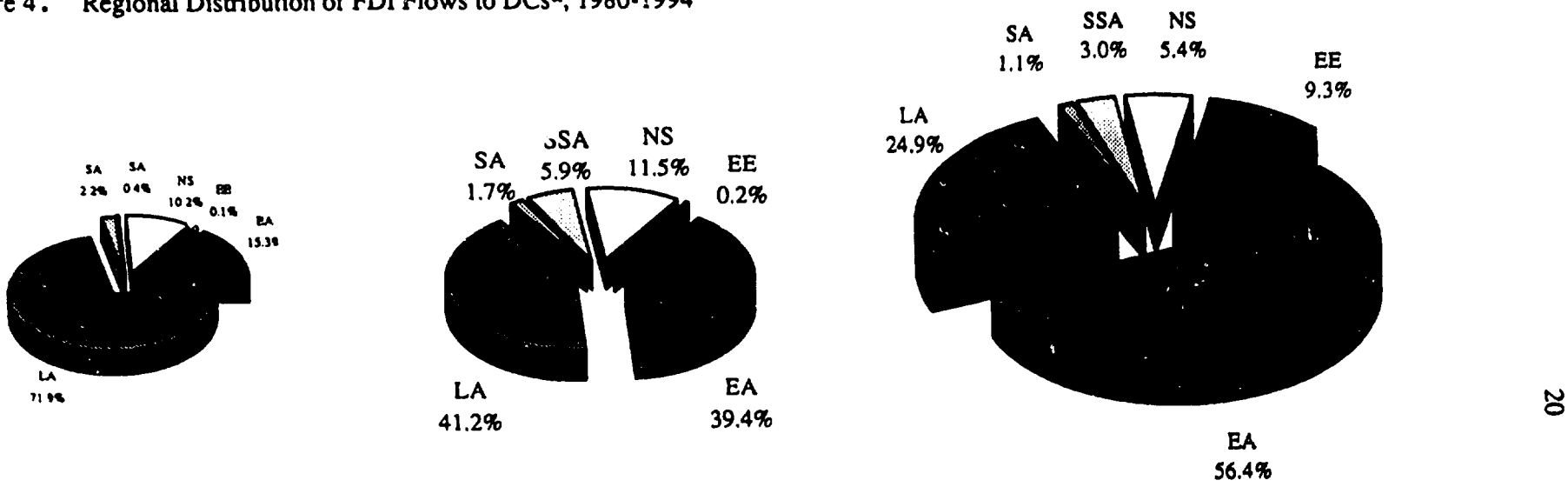
23/ In recent years, this also applies to transition economies in Central and Eastern Europe. After the previous isolation from Western markets had been overcome, the ratio of FDI inflows to gross domestic capital formation reached 8.5 percent in 1992 [UNCTAD 1995b, Table 2].

24/ FDI in China soared from virtually zero in 1980 to US$ 25.8 billion in 1993, i.e. about 39 percent of total FDI flows to DCs (it should be noted, however, that important host countries such as Hong Kong, Singapore and Taiwan Province are not included in the Debtor Reporting System).

25/ The subsequent assessment is restricted to 25 DCs which received FDI inflows of at least US$ 40 million in 1984, in order to exclude unreasonably high 1993/1984 ratios due to extremely low base levels. This explains why transition economies, which opened up towards FDI only recently, are not included among the top performers.

26/ FDI flows to Brazil in 1993 were only half the 1984-figure.

Figure 4. Regional Distribution of FDI Flows to DCs[a], 1980-1994



[a]Percentage share in FDI flows to DCs other than in the Middle East and North Africa; this region is excluded because of significantly negative(net) FDI flows in 1980. Data on Hong Kong, Singapore and Taiwan are not reported in the source. 1994-figures are World Bank projections.

Source: World Bank [1994 b].

UNCTAD 1995b, p. 9]. Frequently it is not taken into account, however, that the country composition of the group of best performers changes over time. The top ten of 1984 experienced a considerable decline in their share in total FDI flows up to 1993 (from 77.2 to 62.6 per cent),[27/] as new investment locations became more attractive. The notion of a consistently high concentration of FDI in DCs thus tends to underrate the opportunities for newcomers to enhance their locational attractiveness to foreign investors.

Table 4. FDI Originating from DCs[a], 1980-1993

	1980	1987	1992	1993
All DCs (percent of worldwide FDI outflows)	2.0	2.2	5.6	4.3
Selected DC regions (percent of all DCs' FDI outflows):				
Africa[b]	4.2	1.8	1.3	1.1
Asia	14.9	64.4	74.0	52.7
Europe	2.9	0.6	0.5	0.7
Middle East	40.8	26.5	16.7	20.5
Western Hemisphere	37.1	6.8	7.6	25.0

[a]Some DCs which are well-known for investing abroad do not report official statistics on FDI outflows. India, Indonesia, Hong Kong and Malaysia are cases in point. Moreover, the source does not provide data on Taiwan. Hence, the share of DCs in worldwide FDI outflows and Asia's share in all DCs' FDI outflows are likely to be underestimated. 1993-figures are not fully comparable to previous figures due to incomplete data (figures for China and Thailand, for example, are not available). – [b]South Africa excluded.

Source: IMF [a].

The chances for newcomers to participate in globalization have been further improved in recent years. Some relatively advanced DCs, which had originally been only recipients of FDI, became increasingly involved in outward FDI.[28/] Their overall contribution to worldwide FDI outflows is still fairly low (Table 4). However, they are playing an important role as foreign investors in specific recipient countries, notably in less advanced neighbouring economies. The so-called flying-geese pattern of East and South-East Asian FDI is the most relevant case in point. In addition to their strong engagement

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27/ This development is the more remarkable as China more than doubled its share during this period. The decline is even larger for the 25 best performers of 1984. At that time, this group attracted 94 percent of total FDI flows to DCs. The share was down to 70 percent in 1993.

28/ The data base on outward FDI by DCs is inadequate (see also the note in Table 4). However, relevant information may be drawn from various sources. In addition to the IMF's Balance of Payments Statistics the OECD [1994c] has presented statistics on outward FDI by nine Asian and Latin American DCs. A recent account of intra-regional FDI stocks among Asian DCs is provided by UNCTAD [1995a, Table 4]; on intra-Asian investment relations, see also Agarwal et al. [1995, pp. 38ff.] and the literature given there. Finally, Page [1995] presents the evidence available for 1992 in a most informative synoptical table.

in China, Asian NIEs (among which Hong Kong was the frontrunner) have invested significantly in medium-income ASEAN countries.[29/] At the same time, the latter undertook investments in lower-income countries such as the China and Vietnam.

The Asian pattern is basically driven by industrial restructuring simultaneously with rising *per capita* income and wages.[30/] The relatively advanced source countries are shifting towards more sophisticated lines of production, while relocating labour-intensive activities to lower-income economies. Similar to Japanese FDI in Asia, most of the NIEs' engagement is export oriented. FDI thus facilitates moving up the ladder of comparative advantage in the source countries and, at the same time, offers opportunities for catching up in the recipient countries. As a result, both country groups are better prepared to benefit from the worldwide trend towards globalized production. In contrast to Asia, intra-regional networking appears to be less advanced in Latin America.[31/] In 1992, reported FDI flows between Latin American economies were largely restricted to Brazilian and Chilean commitments in Argentina. Yet, the higher share of this region in total FDI outflows from DCs in 1993 (Table 4) suggests that Latin America, too, may enhance its integration into the international division of labour by strengthening investment linkages.

IV. SELECTED CASE STUDIES

For several reasons, the globalization of production and its implications for DCs are likely to differ between various manufacturing industries. First, the degree to which production can be globalized depends on industry-specific characteristics. Globalization should be most advanced in industries which lend themselves easily to fragmentation of production processes, or for which production in the various final markets is essential for successful marketing. Globalization may be less advanced in industries characterized by closely intertwined stages of the production process (e.g., feedbacks from production to research and development) and large economies of scale. Second, the countries benefiting from globalization may vary from industry to industry. Notably the implications for DCs will depend on whether their endowment with production factors conforms to the specific demands of a particular industry. Third, the mode of globalization is unlikely to be the same across industries. If internalization incentives are strong, FDI will be the preferred means. NEC may prevail in more standardized manufacturing activities (see Chapter B).

The subsequent sector studies will capture such differences at least tentatively:

- Textiles and clothing provide an example of a highly competitive and labour-intensive industry, in which non-equity forms of globalization have a long tradition.

29/ Furthermore, FDI outflows from the four Asian NIEs (especially Hong Kong and the Republic of Korea) to developed countries such as the US, the UK and Australia gathered momentum in the early 1990s. According to the evidence presented by Page [1995], these investments amounted to US$ 1.9 billion in 1992, i.e. 14 percent of total FDI outflows from Asian NIEs.

30/ For an earlier account of major determinants of intra-Asian networking, see ADB [1990] and Riedel [1991].

31/ This may be partly due to less pronounced differences in per-capita income among Latin American economies. Consequently, complementarities in production structures may be rather weak by Asian standards.

- Chemicals represent a physical capital-intensive industry that has been among the frontrunners of globalization by means of FDI.

- The production of motor vehicles represents a technologically more advanced and human capital intensive sector, in which new competitors from DCs have emerged recently.

The sector studies present some indications of the overall degree of globalization achieved, and then proceed to analyse the implications for DCs. The industry-specific position of DCs is assessed by raising the following questions. First, has production been shifted towards DCs and, if so, which regions have benefited from relocation? Second, to what extent have DCs penetrated developed country markets and from where have new competitive world market suppliers emerged? Third, to what extent have FDI and other means of production sharing been used to integrate DCs into globalization strategies? Definite answers to these questions are sometimes difficult to obtain because of data constraints, however. For example, the statistical base is inadequate with regard to industry-specific FDI flows to various DC groups. Based on various sources, however, a general pattern can nevertheless be identified.

A. Textiles and Clothing

Among the three sectors under consideration, textiles and clothing appears to be best suited to globalization, and DCs are most likely to benefit. Labour intensity is relatively high, which explains why many DCs started industrialization in this sector. Moreover, different stages of the production process have their specific technological and organizational characteristics. This encourages a division of labour by means of international fragmentation of production.[32/] Yet, globalization may have been retarded because the sector has been subject to intense political interference for several decades, notably under the Multi-Fibre Arrangement (MFA).

Nonetheless, indications are that policy interventions by developed countries did not halt globalization:

- World exports of textiles and clothing (SITC categories 65 and 84) grew by a factor of 2.7 between 1980 and 1992. This was significantly above the respective figure for world exports of all categories (1.8).[33/]

- The textile, clothing and footwear industry belongs to the top group of OECD industries with regard to international sourcing [OECD 1994a, p. 18 and Table 18]. The ratio of imported to domestic sourcing of inputs in this industry shows a rising trend in all major industrialized countries since the early 1970s.

32/ This is true, above all, in clothing. Activities such as sewing and garment assembly are "footloose" in the sense that they may be separated from design and cutting, and located where low-skilled labour is cheap. Textile production is more capital intensive, relative to clothing, and does not fit as easily into an international fragmentation of production processes [Dicken 1992, pp. 233ff.; Oman 1989, pp. 207ff].

33/ As a result, the share of textiles and clothing in overall world exports increased from 4.8 (1980) to 7.1 percent (1992) [UN, b].

- In textiles and clothing, FDI has traditionally played a minor role, compared with other manufacturing sectors. However, the sector's share in the total manufacturing FDI outflows of France, Japan and the US increased from 1.1 per cent in 1983-1985 to 2.9 per cent in 1990-1992 [OECD 1994b].[34/] At the same time, the ratio of FDI outflows to exports of textiles and clothing from these countries went up from 0.5 to 3 per cent.[35/] FDI thus expanded more rapidly than exports, which is consistent with the globalization hypothesis. Moreover, as will be shown below, NEC figures prominently in textiles and clothing.

In contrast to automobile and chemical production, textiles and clothing are among the geographically most dispersed manufacturing industries. Taken together, DCs accounted for 35 per cent of world textile production (ISIC 321) and 26.4 per cent of world clothing production (ISIC 322) in 1993.[36/] DCs have expanded their share in world production of both industries by more than 8 percentage points since 1984 (Figure 5). Many DCs, although not all, participated in this favourable development. Asian DCs contributed more than 70 per cent of all DCs' textile and clothing production. Moreover, the increase in production shares was most impressive for this region. The group of East and South-East Asian economies was particularly successful in gaining production shares. However, all other country groups within the Asian region, too, attracted higher shares in world production of textiles and clothing.

The picture is more ambiguous elsewhere. Among the regions considered in Figure 5, dramatically declining production shares are reported for Eastern Europe only. This decline is restricted to the recent past and can be attributed to the general output fall after the collapse of the socialist regime. Modestly declining production shares are shown for Latin America. While much of this decline was concentrated in the 1980s, the downward trend has still continued in recent years. This may suggest that economic policy reforms only pay off with a considerable time lag, if the credibility of governments is seriously eroded because of previous policy failures. In this respect, an encouraging sign may be that Latin America returned to positive growth in output of textiles and clothing in the early 1990s [UNIDO data base]. African DCs increased their production shares slightly. Most notably, Sub-Saharan Africa reported a higher production growth in clothing than all DCs taken together in 1983-1993 (6.3 versus 4.4 per cent). Nevertheless, the overall contribution of African DCs to world production of textiles and clothing remained marginal.

International trade patterns strongly support the hypothesis that DCs benefited from globalized production of textiles and clothing. Indices of export specialization reveal that DCs have achieved international competitiveness in both textiles and clothing. A frequently used index relates the share of textiles and clothing in total DC exports to the share of world exports of these items in total world exports [see, e.g., OECD 1994a, p. 19]. An index higher than 1 indicates a favourable performance of DC exporters of

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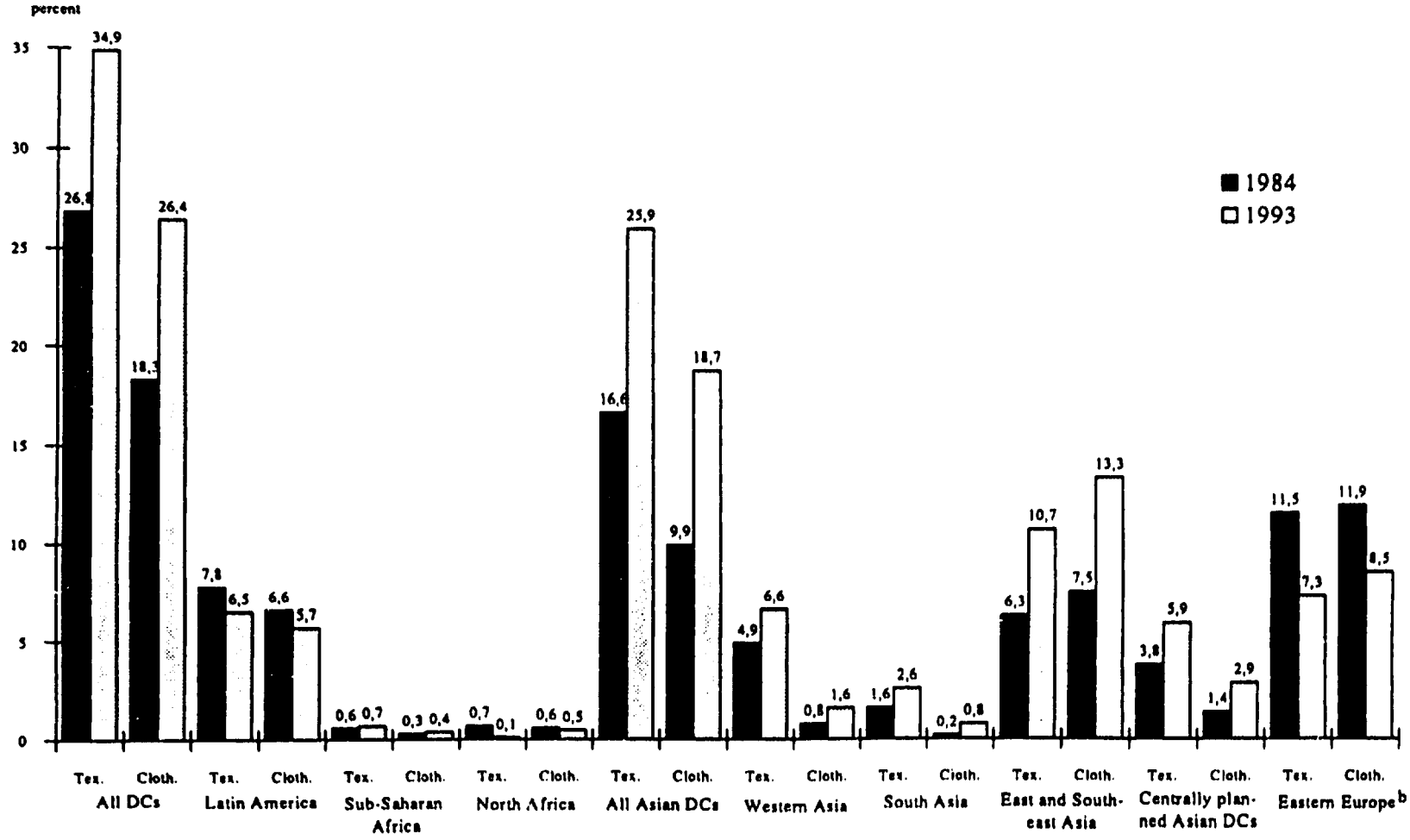
34/ Comparable data for other major source countries, notably the UK and Germany, are not available. Leather is included in the case of France and Japan.

35/ Exports from France, Japan and the US are calculated as the sum of SITC categories 26, 61, 65 and 84 [OECD, a]. Note that the sector classification between FDI and export statistics is slightly different, especially in the case of the US.

36/ Production data are from UNIDO's data base. They represent deflated value added in manufacturing industries, converted to 1990 US dollars.

Figure 5. Share of DCs in World Production of Textiles and Clothing[a], 1984 and 1993 (percent)



[a]Production represents deflated value added, converted to 1990 US dollars. Regional disaggregation according to UNIDO.- [b]Including the former USSR.

Source: UNIDO data base.

textiles and clothing by world standards. In fact, their index for textiles (SITC 65) rose from 0.94 in 1980 to 1.76 in 1992; for clothing (SITC 84), it increased from 1.37 to 2.36.[37/] The higher level and the stronger (absolute) increase in the index for clothing reveals that many DCs have exploited their comparative advantage in this particularly labour- intensive segment. The calculated index figures even tend to understate the international competitiveness of DCs because, in contrast to OECD competitors, DC exporters of textiles and clothing were subject to restrictive MFA regulations.

Table 5. Share of Non-OECD Origins in OECD Imports of Textiles and Clothing,[a] 1983 and 1992 (per cent)

	Textiles (SITC 65)		Clothing (SITC 84)	
	1983	1992	1983	1992
Total non-OECD	23.5	26.5	56.4	61.1
Europe (non-OECD)	2.0	2.2	5.0	5.2
Africa	1.3	1.1	2.0	3.9
Egypt	0.4	0.4	0.0	0.2
Morocco	0.3	0.2	0.5	1.4
Tunisia	0.2	0.1	1.1	1.4
Latin America	2.6	2.1	2.5	4.8
Brazil	1.5	0.9	0.2	0.3
Colombia	0.2	0.1	0.1	0.3
Mexico	0.4	0.6	0.6	1.0
Middle East	1.0	1.4	0.6	1.1
Far East	16.6	19.7	46.2	46.2
Asian NIEs[b]	6.6	5.9	33.9	18.0
China	4.0	5.0	4.8	13.6
India	2.1	2.8	1.9	2.6
Pakistan	1.6	2.5	0.3	1.0
Indonesia	0.2	1.3	0.4	2.1
Thailand	0.7	1.0	0.9	2.0

[a]Countries are selected according to their significance as exporters within the region under consideration; also included are countries for which changes in market shares are notable. – [b]Hong Kong, Singapore, Republic of Korea and Taiwan.

Source: OECD [a].

37/ Data are from UN [1994b].

Table 5 provides more detailed insights into which of the non-OECD exporters of textiles and clothing have benefited from globalization. The criterion is whether and to what extent they have succeeded in penetrating OECD markets for textiles and clothing.[38] In the less labour-intensive production of textiles, the Far East alone (notably China, South Asia and ASEAN countries) accounted for the increase in the market share of non-OECD suppliers by 3 percentage points in 1983-1992. Given the different production characteristics between the two segments of the sector under consideration, it is not surprising that both the level and increase of the non-OECD market share is higher for clothing. Moreover, improved competitiveness is not restricted to one particular region in this case. Albeit from fairly low base levels, the market shares of Africa and Latin America in clothing exports nearly doubled. All major suppliers from these regions participated in this development.[39] This is in contrast to the Far East, for which the extremely high but stagnating market share in clothing obscures remarkable changes within the region.

The sharply declining share of OECD imports of clothing from Asian NIEs may be partly due to discrimination within the MFA framework. However, the major reason seems to be that these relatively advanced economies restructured their manufacturing sectors towards more sophisticated lines of production. Parallel to this shift in Asian NIEs, neighbouring countries with lower *per capita* income emerged as the most competitive suppliers of clothing on OECD markets. While this applies to China in the first place, South Asian and ASEAN exporters also reported rapidly rising market shares.[40]

Successful restructuring within Asia is not only reflected in intra-regional shifts in trade. What has been called the flying geese pattern is also observable with regard to FDI in textiles and clothing. Indications to this effect include the following:[41]

- Hong Kong was the top supplier of clothing on OECD markets in 1983, and 11-12 per cent of its inward FDI stock was still in textiles and clothing at that time. The city state then became the frontrunner in relocating production to neighbouring lower-income DCs.[42] This move received another push once China opened up to FDI [see also ADB 1990, p. 41].

- In 1992, textiles and clothing accounted for 2.4 per cent of total FDI inflows into Taiwanese manufacturing, while the sector's share in FDI outflows was 21.6 per cent. By contrast, (lower-income) Thailand did not report FDI outflows in textiles and clothing to any significant extent, whereas the sector's contribution to FDI inflows in manufacturing was still relatively high.

38/ Again, distortions may arise because of MFA restrictions. This is because MFA regulations have tended to be most damaging to the most competitive DC exporters [see, e.g., Spinanger 1993].

39/ In the OECD statistics used for the calculations in Table 5, the larger part of the increase of Latin America's market share is not allocated to specific countries in this region.

40/ For more detailed accounts along similar lines, see OECD [1994a] and EIU [var. iss.].

41/ The following observations are drawn from various contributions in Asian Development Review [1993] and from OECD [1994c].

42/ One underlying motive was to circumvent quota restrictions. Hence, it may be argued that the MFA has in fact enhanced the globalization of textile and clothing production, notably in Asia [Oman 1989, p. 237; Nunnenkamp et al. 1994, p. 74].

- In ASEAN countries, the earlier focus of FDI inflows on resource processing was subsequently replaced by a shift towards labour-intensive manufacturing. FDI in textiles and clothing figured prominently in this respect, and much of it originated from Asian NIEs.

- South Asia's involvement in intra-Asian networking remained relatively weak [Agarwal et al. 1995]. The case of India suggests that this is at least partly due to restrictions imposed on FDI in labour-intensive manufacturing such as textiles and clothing. Lall [1993, pp. 108f.], for example, argues that the upgrading of Indian clothing exports was retarded in this way. This may explain why India's share in OECD imports of clothing increased only modestly when compared with newly emerging Asian competitors (Table 5).

As already pointed out, outward FDI by OECD countries is small in textiles and clothing relative to FDI in the manufacturing sector as a whole. Among major investor countries, the sector's share was highest in overseas FDI stocks held by Japan (1992: 4.8 per cent of FDI stocks in manufacturing) [OECD 1994b]. About two-thirds of Japan's commitment was in Asian DCs [OECD 1994a, p. 21]. Moreover, mainly Asian neighbours benefited from subcontracting with Japanese producers and trading companies (sogo shosha) [Dicken 1992; Oman 1989].

Other DC regions also became integrated into the globalization strategies of TNCs. The Caribbean, Mexican and Colombian clothing industries attracted FDI from the US [OECD 1994a, p. 22]. Likewise, Mediterranean countries (e.g., Morocco and Tunisia) were the target of EU FDI. More importantly, though, the degree to which DCs benefited from globalization of US and EU producers would be seriously understated if non-equity forms of production sharing were ignored [Nunnenkamp et al. 1994, pp. 75f.]. Contractual arrangements have been widely used for the production and delivery of finished products by independent DC suppliers. Major partners of EU producers include companies in Turkey, Hong Kong and, increasingly, China. Furthermore, subcontracting has played a significant role in offshore processing of clothing. The ensuing fragmentation of EU production has basically followed the pattern established by preferential trade arrangements. Accordingly, Mediterranean countries and the ACP group had the best chances of attracting offshore processing activities.[43/] With economic transformation proceeding, Central and Eastern Europe has become another attractive location for offshore processing.[44/]

All in all, DCs have participated successfully in the globalized production of textiles and clothing, even though they were subject to restrictive MFA regulations. In all probability, their integration into the worldwide division of labour will be further enhanced since the Uruguay Round provides the reintegration of MFA trade into the GATT/WTO framework.

43/ Note, however, that the extent to which privileged partner countries succeeded in this respect depended critically on domestic investment conditions. Free access to EU manufacturing markets did not prevent the continuous decline of the ACP share in EU imports [Hiemenz et al. 1994, Table 2].

44/ Processed clothing exports to the EU doubled within three years to ECU 13 billion in 1992, 80 per cent of which were from Poland, Hungary and Romania [Nunnenkamp et al. 1994, p. 76].

B. Chemicals

The chemical industry has been a frontrunner with regard to globalization. For major investor countries, it accounts for a substantial share of total overseas FDI stocks in manufacturing.[45/] Also in terms of FDI outflows, globalization was most advanced within the three sectors analysed in this study. FDI outflows in chemicals averaged 22 per cent of outflows in all manufacturing industries by France, Germany, Japan, the UK and the US in 1990-1992 [OECD 1994b]. The FDI-to-export ratio for the same group of countries and time period of about 7 per cent far exceeded the corresponding ratio for both textiles/clothing and motor vehicles. Furthermore, Figure 6 shows that chemicals conform perfectly to the predicted pattern of globalization, i.e., export growth surpassing production growth, and FDI growing even faster than exports.

Globalization in this physical capital-intensive industry largely depends on the strategies of ten huge TNCs based in OECD countries. They accounted for 20 per cent of world sales in 1988 [OECD 1992, p. 66]. Recent merger and acquisition activities have probably added to concentration [Nunnenkamp et al. 1994, p. 67 and Table A6]. Nearly four-fifths of worldwide turnover in chemicals was accounted for by OECD countries in 1993 [Verband der Chemischen Industrie 1994, p. 105]. All this seems to suggest that globalization in the chemical industry is largely restricted to industrialized economies.

Nonetheless, non-OECD producers have become increasingly involved in the chemical industry. The share of all DCs in world production ranged between 13 per cent for plastic products and 18 per cent for industrial chemicals in 1993 (Table 6).[46/] In the light of different factor intensities, is not surprising that the DC share remained lower in chemicals than in textiles and clothing. Nevertheless, both sectors have several things in common as concerns the role of DCs in globalized production. First of all, chemical production expanded overproportionally in DCs. The increase of the share of all DCs in world production was most pronounced for industrial chemicals.[47/]

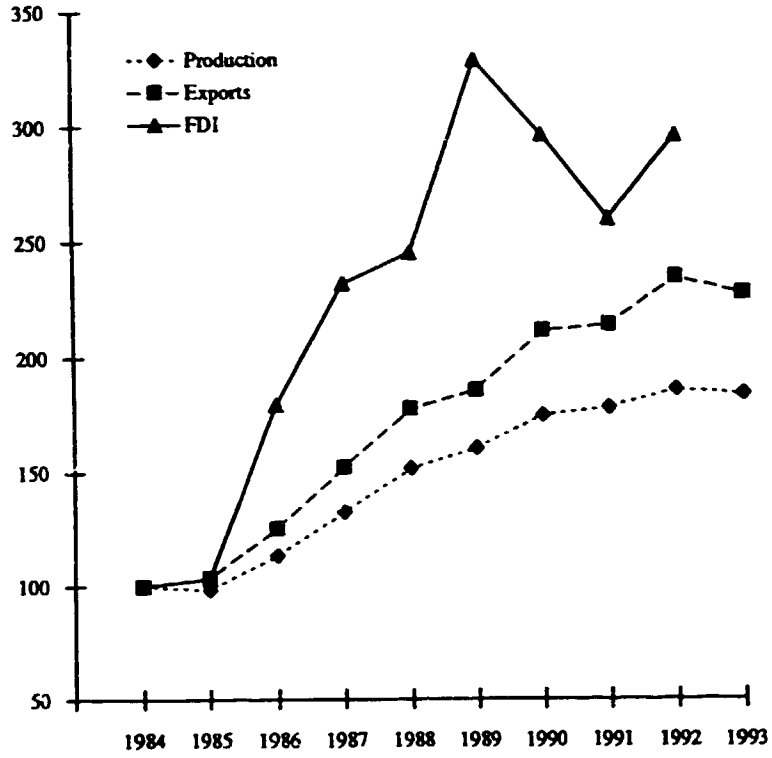
Second, chemical production by DCs became increasingly concentrated on the Asian region. In the case of industrial chemicals, Asian DCs as a whole nearly doubled their share in world production, and their contribution to total DC production rose from 44 per cent in 1984 to 70 per cent in 1993. The group of East and South-East Asian economies accounted for most of the increase in chemical production within Asia. Again, however, other Asian DCs became more important production locations as well. This refers in particular to (formerly) centrally planned economies in this region, whereas Western Asia benefited from shifts in worldwide production only in the case of industrial chemicals.

45/ Its share was particularly high in German FDI stocks (37 per cent of all manufacturing industries in 1992) [Deutsche Bundesbank 1994]. The corresponding shares amounted to 23 per cent for the US (end-1993) and 14 per cent for Japan (March 1993) [US Department of Commerce 1994; Ministry of Finance 1993].

46/ As in the case of textiles and clothing, production refers to deflated value added, converted to 1990 US dollars, and data are from UNIDO.

47/ Also similar to its position in textiles and clothing, Eastern Europe suffered from declining production shares in the early 1990s, i.e. during transition to a market economy.

Figure 6. Production, Exports and FDI Outflows of the Chemical Industry,[a] 1984-1993 (1984 = 100)



[a] Based on data for EU countries, the US and Japan. FDI data are incomplete for the EU (in particular, Germany is not included). Production refers to turnover, exports to SITC 5.
Source: Verband der Chemischen Industrie [1994]; UN [1994b]; OECD [1994b].

Table 6. Share of DCs in World Production of Chemicals,[a] 1984 and 1993 (per cent)

	Industrial chemicals (ISIC 351)		Other chemical products (ISIC 352)		Plastic products (ISIC 356)	
	1984	1993	1984	1993	1984	1993
All DCs	14.8	18.0	14.1	16.5	12.7	12.9
Latin America	7.6	4.6	7.6	7.9	4.9	3.3
Sub-Saharan Africa	0.1	0.1	0.3	0.3	0.2	0.2
North Africa	0.2	0.3	0.3	0.3	0.2	0.2
All Asian DCs	6.6	12.6	5.6	7.6	7.1	9.1
Western Asia	1.2	2.2	1.6	1.6	1.3	1.1
South Asia	0.7	1.0	0.7	0.9	0.1	0.3
East and South-East Asia	2.2	5.2	2.1	3.6	4.5	5.9
Centrally planned Asian DCs	2.5	4.3	1.2	1.6	1.2	1.8
Eastern Europe[b]	5.8	4.0	2.5	1.6	1.4	0.8

[a]Production refers to deflated value added, converted to 1990 US dollars. Regional disaggregation according to UNIDO. – [b]Including the former USSR.

Source: UNIDO data base.

Third, Latin America hosted a larger share of worldwide production of industrial and other chemicals than Asian DCs in 1984. As a production location for industrial chemicals, Latin America lost considerably in importance during the second half of the 1980s; the declining trend of the region's production share in this segment of the chemical industry was arrested only recently. Diverging developments occurred in other segments: Latin America's high share in world production of other chemicals remained virtually unchanged, whereas its role in the production of plastics continued to decline until 1993. Finally, chemical production in African DCs remained marginal compared with all other DC regions. This was to be expected, considering the rather unfavourable position of African DCs even in industries which are better suited to their factor endowments than chemicals.

The world market performance of DCs in the chemical industry (SITC 5) underlines major findings revealed by production trends and provides some additional insights into the competitive position of these countries. The export specialization index (introduced in the previous section) reveals that DCs as a whole have improved their international competitiveness in chemicals. The share of SITC 5 in their total exports, relative to the share of world chemical exports in world total exports, more than doubled from an index figure of 0.25 in 1980 to 0.53 in 1992.[48/] However, the index is still substantially below 1, indicating that DCs did not meet the world standard with regard to the weight of chemicals in overall trade. Accordingly, the share of all non-OECD suppliers in chemical imports of OECD countries is only a fraction of their import share in textiles and clothing (Tables 7 and 5). This is due to different factor intensities prevailing in these two sectors.

Against this background, it is not surprising that the number of DCs reporting rising shares in OECD imports of SITC 5 is smaller, particulary when compared with clothing. More interestingly, though, the country composition of the group of most successful exporters differs between chemicals and clothing. In chemicals, mainly Asian NIEs made progress in penetrating OECD markets, i.e. exactly those economies reporting declining market shares in clothing. This supports the proposition that various DC groups at different stages of economic development may benefit from globalization. The more advanced division of labour on a worldwide scale helped the relatively advanced DCs to upgrade their export structure. This in turn provided better chances for less advanced newcomers to enter world markets for more traditional, labour-intensive products, in which the frontrunners with regard to world market orientation were losing their comparative advantage.

Furthermore, Table 7 points to a highly diverse picture in different branches of the chemical sector:

- The share of non-OECD suppliers in OECD imports is lowest for pharmaceuticals. It is only in this branch that even Asian NIEs did not gain market shares in 1983-1992. Arguably, the pharmaceutical industry is one of the

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48/ The contribution of SITC 5 to total DC exports nearly tripled from 1.8 to 4.8 per cent, while its share in world exports increased only modestly from 7 to 9.1 per cent [UN 1994b].

most difficult for DCs to enter: It is highly concentrated and belongs to the most R & D intensive manufacturing activities; product innovation is a crucially important competitive parameter [OECD 1992, pp. 75ff.].

- For dyeing and related materials (SITC 53) and plastics (SITC 57 + 58), market shares of non-OECD suppliers are not much higher. In contrast to pharmaceuticals, however, OECD imports from non-OECD origins have increased overproportionally. With few exceptions (notably Argentina), this applies to all the individual DCs considered in Table 7. Cases of considerable progress in penetrating OECD markets are largely in the Middle and Far East; they include Asian NIEs and, in SITC 53, China and India.

Table 7. Share of Non-OECD Origins in OECD Imports of Chemicals,[a] 1983 and 1992 (per cent)

	All chemicals (SITC 5)		Organic chemicals (SITC 51)		Inorganic chemicals (SITC 52)		Dyeing materials, etc. (SITC 53)		Pharma-ceuticals (SITC 54)		Plastics (SITC 57+58)	
	1983	1992	1983	1992	1983	1992	1983	1992	1983	1992	1983	1992
Total non-OECD	9.1	8.5	9.4	11.6	22.3	17.7	3.3	5.9	5.1	3.6	4.7	6.0
Europe (non-OECD)	2.8	2.1	2.8	2.0	6.9	5.7	0.5	0.7	0.8	0.6	1.9	1.6
Africa	1.6	0.6	0.5	0.3	8.6	3.4	0.6	0.3	0.2	0.0	0.1	0.1
Morocco	0.2	0.1	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
South Africa	0.6	0.2	0.1	0.1	3.9	1.4	0.6	0.3	0.1	0.0	0.1	0.0
Tunisia	0.2	0.1	0.0	0.0	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Latin America	2.1	1.6	3.4	2.9	3.9	3.4	1.0	1.1	1.7	0.8	0.7	0.8
Argentina	0.2	0.1	0.4	0.2	0.0	0.1	0.5	0.4	0.1	0.2	0.2	0.0
Brazil	0.7	0.4	1.5	0.7	0.3	0.7	0.2	0.2	0.2	0.2	0.2	0.3
Mexico	0.5	0.5	0.4	0.8	1.8	1.3	0.2	0.4	0.3	0.2	0.3	0.4
Middle East	0.6	0.9	0.6	1.6	1.1	1.2	0.0	0.1	0.1	0.2	0.3	0.9
Far East	2.0	2.3	2.2	4.8	1.8	3.9	1.2	3.6	2.3	1.9	1.6	2.7
Asian NIEs[b]	0.9	1.6	1.1	2.7	0.5	0.8	0.7	1.7	1.0	0.5	1.5	2.4
China	0.7	1.0	0.8	1.1	1.2	2.8	0.2	0.6	1.0	1.2	0.1	0.1
India	0.1	0.3	0.1	0.4	0.0	0.1	0.3	1.1	0.1	0.2	0.0	0.0
Malaysia	0.1	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Thailand	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1

[a]Countries are selected according to their significance as exporters within the region under consideration; also included are countries for which changes in market shares are notable. – [b]Hong Kong, Singapore, Rep. of Korea, Taiwan.

Source: OECD [a].

- More than half of worldwide chemical production is accounted for by industrial chemicals, among which the relation between organic and inorganic chemicals is roughly 2 to 1 [OECD 1992, p. 65]. For non-OECD sources as a whole, the

increase in the market share of organic chemicals contrasts sharply with the decline (from a fairly high level) in inorganic chemicals. The latter is mainly due to the unfavourable performance of Africa.[49/] DCs in other regions gained market shares (except Mexico), with China the best performer by far. The same is true of organic chemicals, which are generally based on petroleum and natural gas; the notable exception in this branch is Brazil, whereas Asian NIEs performed best.

All in all, the OECD's import structure confirms that progress in entering world chemical markets was concentrated in Far East economies. This development was not restricted to Asian NIEs, however, but included lower-income countries such as China and India in different segments of the chemical sector.

OECD-based TNCs are estimated to account for about a quarter of DC production of chemicals [OECD 1992, p. 68]. This indicates already that FDI has encouraged the integration of emerging chemical producers into the international division of labour. The distribution of overseas FDI stocks held by the chemical industry of major investor countries reveals some interesting features in this respect (Table 8). The counterpart to Africa's poor world market performance was its failure to attract FDI to any significant extent. Latin American DCs (especially Brazil and Mexico) hosted more than 70 per cent of German and US FDI in the chemical sector of non-OECD countries in the early 1990s. Asian DCs were largely ignored by German investors.[50/] Among Asian DCs, which hosted about one-third of US FDI stocks, the group of four NIEs received the greatest attention from US investors. By contrast, Indonesia was the most important recipient of Japanese FDI. Generally, it appears that the integration of Asian DCs into world chemical markets was fostered by relocation of Japanese production in the first place [see also OECD 1992, p. 72].[51/] Asia's share in total chemical FDI stocks of Japan was five times as large as that of US FDI (and exceeded the corresponding share in German FDI by a factor of 16).

The role of FDI in stimulating chemical production in DCs is underscored by the prominence of this sector in total FDI inflows of major host DCs in the late 1980s and early 1990s.[52/] For four out of seven host countries (Argentina, Mexico, the Republic of Korea, and Taiwan Province), the chemical industry accounted for 23-26 per cent of total FDI inflows in manufacturing. Among manufacturing industries, chemicals ranked first (Republic of Korea) or second, only surpassed by motor vehicles in Argentina and Mexico, and by electric and electronic equipment in Taiwan Province. The contribution of chemicals to overall FDI inflows in manufacturing ranged between 10-14 per cent in Malaysia, Singapore and Thailand. It ranked second (behind electric and electronic equipment) in the latter two countries.

49/ The Republic of South Africa is included under non-OECD sources in the trade statistics on which Table 7 is based, whereas this country was not included in Table 6.

50/ The weak representation of German investors in Asian DCs is not restricted to chemicals, but rather a general feature of past FDI patterns [Agarwal et al. 1991].

51/ It is noteworthy that China's share of Japanese FDI in chemicals was still relatively low by the end of 1992.

52/ The relevant information is available for five host countries in Asia and two host countries in Latin America [OECD 1994b; 1994c]. Figures in the text refer to the 1988-1992 period, except for Argentina (1990-1992), Singapore and South Korea (1988-1991).

Table 8. FDI Stocks in Chemicals held by Germany, Japan and the US in DCs
(per cent of total FDI stocks in chemicals of the respective source country)

	Germany[a] (1992 stocks)	Japan[b] (cumulative flows 1951-92)	US[c] (1993 stocks)
African DCs	0.1	0.2	n.a.
Latin America	9.3	6.0	13.9
Argentina	1.0	n.a	1.0
Brazil	4.0	2.3	4.6
Chile	n.a.	n.a.	0.3
Colombia	n.a	n.a	0.6
Mexico	3.1	n.a.	5.2
Venezuela	n.a.	n.a.	0.6
Asian DCs	1.8	29.4	5.8
China	n.a.	0.6	0.1
Hong Kong	n.a.	0.2	0.3
Singapore	n.a.	5.9	1.1
Republic of Korea	0.5	3.3	0.5
Taiwan	n.a.	n.a.	1.7
India	0.3	n.a.	0.3
Indonesia	n.a.	10.6	0.1
Malaysia	0.4	3.0	0.1
Philippines	n.a.	n.a.	0.8
Thailand	n.a.	2.0	0.5
Middle East	n.a.	8.1	n.a.
OPEC	0.6	n.a.	n.a.
Central and Eastern Europe	0.8	n.a.	0.1
Total	12.6	43.7	19.7

[a]OPEC countries not included in DC regions. Central and Eastern Europe includes formerly centrally planned economies in Asia (notably China). Total represents the sum of all DCs, as given in the source, OPEC and Central and Eastern Europe. – [b]OPEC countries included in the respective regions. Middle East not included in Asian DCs. Total: sum of African DCs, Latin America, Asian DCs and Middle East. – [c]OPEC countries included in the respective regions. Asian DCs: Asia and Pacific, as given in the source, minus Australia, Japan and New Zealand. Total: sum of Latin America, Asian DCs and Central and Eastern Europe.

Source: Deutsche Bundesbank [1994]; Ministry of Finance [1993]; US Department of Commerce [1994].

In addition to FDI, international linkages have been established through NEC.[53/] In a number of cases, TNCs have participated in establishing petrochemical plants in DCs through technical cooperation agreements, turnkey projects, management and marketing contracts, and licensing. Examples include: Argentina, Brazil and Mexico in Latin America, and India, China, Republic of Korea, Taiwan Province and ASEAN countries in the Far East [Ward 1992, p. 7; Oman 1989]. Pharmaceuticals and other chemicals accounted for nearly one-third of all non-equity investments in Bangladesh during the 1980s [Reza 1992]. Franchising has increasingly been used as a flexible instrument of globalization in countries where business risks and bureaucratic hurdles are still high (e.g., in Central and Eastern Europe).

In summary, globalization in the chemical industry has gone beyond fierce competition among OECD suppliers since recently. The Triad of the EU, Japan and the US will continue to dominate this sector for the time being. However, the evidence presented above supports earlier forecasts that the Asian-Pacific region has the best chances of expanding production and exports of chemicals [UNIDO 1990, p. 187]. High growth projections for Asian chemical markets are fuelling FDI inflows into this region. The integration of newly emerging producers of chemicals into the international division of labour may gain further momentum once the uncertainty of foreign investors induced by insufficient protection of intellectual property rights is reduced.[54/] The recent agreement on trade-related intellectual property rights (TRIPs) during the Uruguay Round represents a major step in this direction.

C. Motor Vehicles

Among manufacturing industries, motor vehicles rank third in terms of FDI stocks held abroad by the US and Germany in 1992 [OECD 1994b][55/] FDI outflows originating from these two countries averaged 3.5 per cent of motor vehicle exports in 1990-1992.[56/] This ratio was lower than in chemicals, but substantially above the FDI-to-export ratio in the textile and clothing industries of the US and Germany. Furthermore, the US ratio increased from 2.2 per cent in 1983-1985 to 5.2 per cent in 1990-1992 (German data are not available). All this suggests that globalization prevails in the manufacturing of motor vehicles as well.

Yet, of the three sectors analysed in this study, it may be most difficult for DCs to participate in globalized production of motor vehicles. This sector applies relatively advanced technologies and is, thus, fairly demanding in terms of human skills. Few DCs have emerged so far as important producers of motor vehicles (Table 9).[57/] Nonetheless, their share in worldwide production has increased significantly, however.

53/ For details, see Nunnenkamp et al. [1994, pp. 67f. and Table A6] and the literature given there.

54/ Infringements of property rights by DCs have been widespread, especially with regard to pharmaceuticals. For a detailed discussion of this issue, which is beyond the scope of this study, see OECD [1992, pp. 77ff.].

55/ The sector's contribution to overseas FDI stocks in manufacturing amounted to 13.1 and 17.6 per cent for the US and Germany, respectively. Comparable data for other major automobile-producing countries are not available.

56/ The FDI-to-export ratio was lower in Germany (2.7 per cent) than in the US (5.2 per cent). Exports relate to SITC 78 and are from OECD [a].

57/ Note that data on Taiwanese production are missing. Smaller assembly operations in DCs are ignored in the following. Frequently, they are subject to restrictions imposed on imports of finished cars. They are, thus, hardly relevant in the context of globalization.

Within a decade, production soared nearly eightfold in Republic of Korea and surpassed 2 million units in 1993. In China and Mexico, production expanded by a factor of 3.7 and 3.0 respectively. As a result, earlier projections on production shares of non-OECD suppliers were considerably exceeded.[58/] The discrepancy between actual and hypothesized production shares is likely to increase further. The group of newly emerging suppliers of motor vehicles will be enlarged, as soon as Western involvements in the automobile sectors of transition economies in Central Europe result in increased production in this region.

Table 9. Production of Motor Vehicles by Major Non-OECD Suppliers, 1984 and 1993 (per cent of worldwide production)

	1984	1993
Central and Eastern Europe		
Czechoslovakia (*former*)	0.5	0.5
Hungary	0.0	0.1
Poland	0.8	0.6
Romania	0.3	0.2
Soviet Union (*former*)	5.2	3.4
Yugoslavia[a] (*former*)	0.6	0.0
Latin America		
Argentina[a]	0.4	0.7
Brazil	2.0	3.0
Mexico	0.8	2.3
Asia		
China	0.7	2.5
India	0.4	0.8
Republic of Korea	0.6	4.4
South Africa[a]	0.6	0.6
All 13 countries[b]	13.3	19.1

[a]Significant assembly activities included. - [b]Differences due to rounding.

Source: VDA [var. iss.].

The regional distribution of production of auto parts is more difficult to assess, as comparable statistics are largely lacking. Until the late 1980s, parts production was concentrated in OECD countries at least as strongly as automobile production. According to estimates by the OECD [1992, p. 35], the Republic of Korea and Taiwan Province recorded a noteworthy - and rising - production of autoparts. Anecdotal evidence suggests, however, that non-OECD suppliers have increased their share in parts production recently.

58/ For example, projections are reported in OECD [1992, pp. 41f.], according to which non-OECD countries were expected to account for about 16 per cent of worldwide production of motor vehicles by 2000.

First, major DC producers of motor vehicles have achieved a very high local parts content [OECD 1992, pp. 52f.]. In Republic of Korea, nearly 90 per cent of automotive inputs used by national assemblers were supplied by domestic firms. Local content is well over 80 per cent in Brazil and Argentina, and in the range of 60-70 per cent in Mexico. Taiwan Province attempted to develop a largely self-sufficient automobile industry by the 1990s, while ASEAN countries promoted parts production at the regional level.[59/] Second, UN data suggest that more than 17 per cent of worldwide production of motor vehicle engines (ISIC code 3843-04A) originated from Mexico and Republic of Korea in 1992; five years earlier, the share of these two countries had been 11.3 per cent [UN 1994a, p. 824].[60/] Third, some DCs have attracted offshore autoparts production by OECD firms. Significant US and Japanese investment in Mexico's duty-free zones is a case in point [OECD 1992, p. 53]. Likewise, US car manufacturers operating in Brazil export parts back to the US. Brazil's integration into the globalization strategies of automobile TNCs is reflected by a particularly high share of exports of automotive inputs (including chassis, bodies, parts and accessories) in its total automotive exports (1992: 38 per cent) [VDA 1994, pp. 333ff.].[61/] Also the rather indigenous Korean industry has started supplying autoparts to foreign car manufacturers (about 10 per cent of its total auto parts production), mostly to Japan.[62/]

The regional structure of OECD imports of road vehicles (SITC 78)[63/] supports major findings about the distribution of worldwide production (Table 10). OECD countries continued to dominate, and non-OECD competitors were still few. Yet, some of the newly emerging suppliers made considerable progress in penetrating OECD markets. This applies to Mexico, the Republic of Korea and Taiwan Province in the first place. The parallel increase of domestic production and export market shares (except for Brazil) indicates that the motor vehicle industry of some relatively advanced DCs has become competitive by world market standards.

In most instances, this development was helped by drawing on Western skills and technology. FDI played the dominant role in Latin America's motor vehicle industry. This sector accounted for 27 per cent of Mexico's FDI inflows in manufacturing in 1988-1992 [OECD 1994b, p. 161]. The respective share amounted to 39 per cent in Argentina (1990-1992), and 17 per cent in Brazil (1983-1987) [OECD 1994c].[64/] Latin America hosted nearly all German FDI stocks in the motor vehicle industry of DCs (DM 4.5 billion in 1992) [Deutsche Bundesbank 1994].[65/] Also US FDI in the motor vehicle industry of DCs was heavily concentrated on this region [US Department of Commerce 1994, p. 137]. The major motive underlying German and US investment was to penetrate

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59/ In addition to the Malaysian car Proton Saga, ASEAN countries have recurrently attempted to push the "ASEAN car" project.

60/ However, the increase in production shares of Mexico and the Republic of Korea is somewhat overstated because of missing entries for some producers (notably Germany) in 1992.

61/ This share was higher than in Germany (24 per cent) and Japan (18 per cent), whereas components and parts accounted for nearly half of automotive exports by the US.

62/ In 1990, about 13 per cent of the Republic of Korea's total automotive exports consisted of parts and accessories [VDA 1994, p. 335].

63/ Note that SITC 78 includes auto parts.

64/ Brazil's motor vehicle industry has suffered from FDI outflows since 1988, probably due to deteriorating investment conditions (particularly in comparison with Mexico).

65/ All DCs hosted 27 per cent of total German FDI stocks in the motor vehicle industry.

large – and protected – markets of Latin American economies. Nevertheless, operations in Brazil and Mexico were increasingly integrated into the global sourcing strategies of TNCs (notably of US companies).

Table 10. Share of Non-OECD Origins in OECD Imports of Road Vehicles (SITC 78)[a], 1983 and 1992 (per cent)

	1983	1992
Total non-OECD	2.1	5.5
Europe (non-OECD)	0.8	1.0
Africa[b]	0.1	0.1
Latin America	0.8	2.5
Brazil	0.3	0.3
Mexico	0.4	2.2
Middle East	0.0	0.0
Far East	0.5	1.9
China	0.0	0.2
Republic of Korea	0.1	0.7
Taiwan	0.4	0.8

[a]Countries are selected according to their significance as exporters within the region under consideration; also included are countries for which changes in market shares are notable. – [b]Including South Africa, which almost exclusively accounts for African exports of SITC 78.

Source: OECD [a].

When compared with Latin America, FDI played a less important role in the motor vehicle industries of Asian countries.[66/] In the Republic of Korea, the sector's share in total FDI inflows in manufacturing amounted to 14 per cent in 1989-1991 [OECD 1994c, p. 13]. Nonetheless, the development of local automobile production has been considerably helped by establishing links with leading Western companies. Government policies in Asian DCs have gradually shifted from high protection of domestic automobile producers to a greater degree of global interaction, in order to encourage technology transfers from OECD countries [OECD 1992, pp. 52f.]:

- ASEAN countries concluded an agreement with Mitsubishi to help promote the ASEAN car project.

66/ However, Japanese equity participation in joint ventures with Indian manufacturers has introduced modern technology into India's motor vehicle industry. As a result, this rather "moribund ... industry has been reinvigorated" [D'Costa 1995, p. 486].

- The Korean auto parts industry was built on the basis of licensing and other inter-firm arrangements, mainly with Japanese companies.[67/]

- Recently, major EU automobile producers have also entered into cooperation agreements and joint ventures with minor equity stakes in the Republic of Korea, Taiwan Province, India and, most notably, in China.[68/]

It may be difficult to predict the future shape of the world's motor vehicle industry, which will depend on the strategies of major OECD firms in the first place. Technological and organizational innovations, including lean production, flexible workshops and just-in-time delivery, may result in closer networking between input suppliers, car assemblers and customers at the regional level. If so, worldwide sourcing and export-oriented offshore production would become less important in determining international competitiveness of car manufacturers [Oman 1994]. In any case, however, some new competitors from relatively advanced countries in the Far East, Latin America and Central Europe are well prepared to participate successfully in the future development of worldwide production of motor vehicles. First attempts to establish production facilities in the OECD, such as the assembly plant of the Korean car manufacturer Hyundai in Canada, are a clear indication to this effect.

Finally, the experiences of Brazil and Mexico suggest that the opportunities for new competitors to benefit from globalization in this relatively sophisticated industry are critically dependent on domestic economic policies and the ensuing local investment climate. It is probably not just by coincidence that Mexico succeeded to improve both its attractiveness for FDI and its competitive position on automotive OECD markets, relative to Brazil. Rather, these developments seem to be related to comprehensive reform efforts in Mexico, and at best partial attempts at macroeconomic stabilization and structural adjustment in Brazil. This proposition is further elaborated in the next section.

V. The Future Position of Developing Countries in Globalized Production

The previous chapters have demonstrated the different degree to which various DCs are participating in the globalization of production and markets. What makes up for these differences, and what are the determinants of becoming an attractive location for risk capital? Once the determinants are understood, it will be possible to draw some policy conclusions for those DCs that want to follow the way which was led by many Asian DCs, especially during the past decade.

67/ In 1980-1986, Korean parts producers formed 21 joint ventures and concluded 160 technology licensing agreements with OECD companies [OECD 1992, p. 53].

68/ For details, see Nunnenkamp et al. [1994] and the literature given there.

The Impact of Domestic Economic Policies

The major factors shaping the future position of DCs in globalized production concern the stance of domestic economic policies with respect to macroeconomic stability, investment, and human capital formation. Figure 7 presents selected evidence as to why East Asia has been more successful than other groups of DCs[69/] in attracting FDI and other forms of international business cooperation, and why it has become the new powerhouse of the world economy. The first indicator of a sound business environment is macroeconomic stability, namely the absence of high and volatile rates of inflation. High rates of inflation render it difficult for consumers and producers to identify relative price changes. The reduced informational content of observed price changes results in higher investment risks, and in a misallocation of resources. Inflation safe, though less productive investments will be preferred. Unexpected inflation may have a positive output effect in the short run by reducing real wages. However, money illusion is unlikely to prevail for long. Future wage demands will take into account the expected rate of inflation. Eventually, this process may end up in hyperinflation, output decline, soaring unemployment, and political chaos. Latin America performed most unfavourably in this respect in the past, followed by Sub-Saharan Africa and Central Europe. In the latter, high rates of inflation largely reflect soft budget constraints of state-owned enterprises which relied on government support for sustaining production and employment.

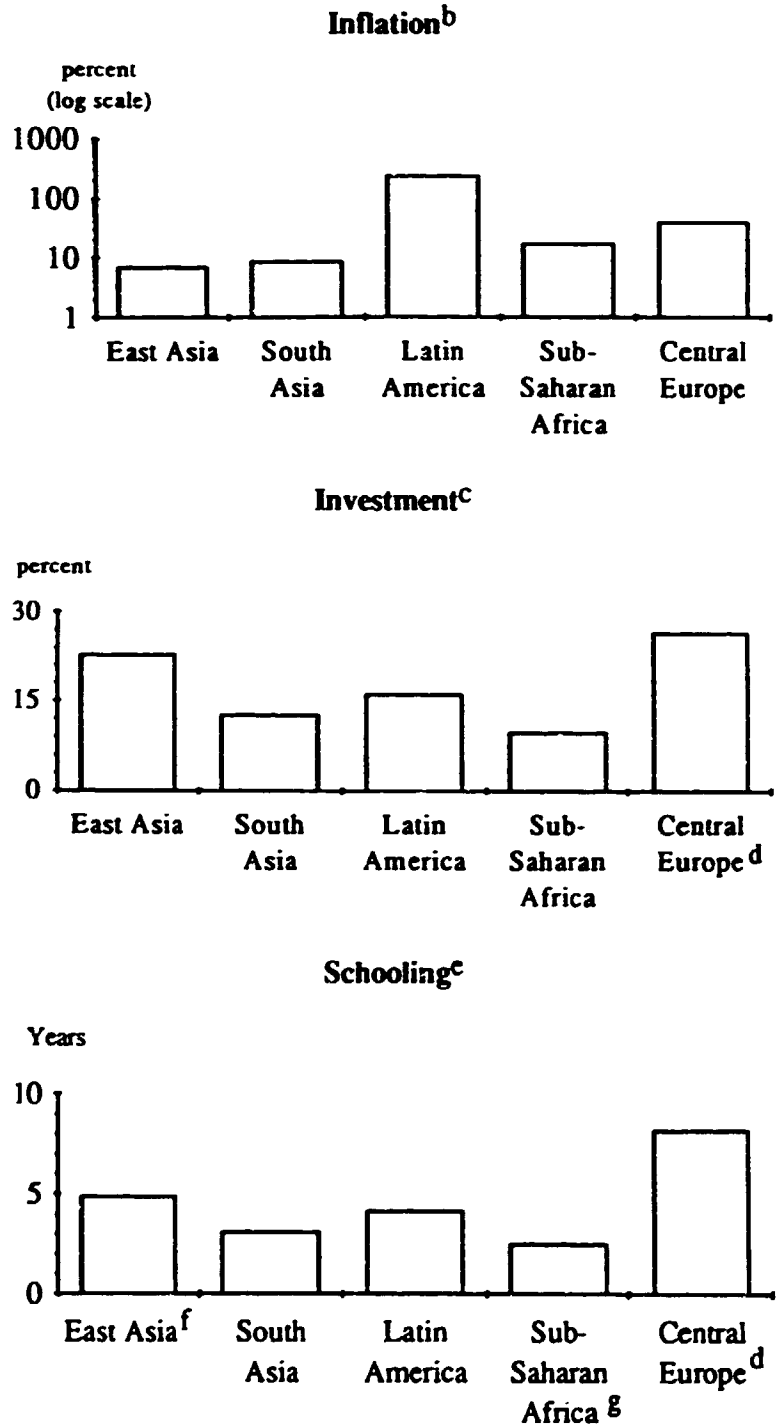
Persistent inflation is generally home-made, budget deficits of the government being the main reason. This is most obvious when deficits are financed by printing money. Alternatively, the higher the budget deficit, the higher the taxes that producers and consumers have to pay. High business taxes impair the incentive to invest and thereby reduce productivity growth; high income taxes impair the incentive to work (except for work in the underground economy), and thereby further enforce the pressure to increase taxes. It follows that countries with large budget deficits and high rates of inflation are relatively unattractive locations for international investors, and cannot be expected to experience strong economic growth in the long run.

Macroeconomic stability appears to be a necessary precondition for participation in globalization. In a stable macroeconomic environment, investment can be expected to be higher because risks are contained. More investment enlarges the stock of capital per worker, increases labour productivity, and produces higher incomes in the long run. The second panel in Figure 7 demonstrates that low-inflation East Asia displays an outstanding investment performance among DCs.[70/] Yet, the case of Central Europe demonstrates that high investment does not guarantee successful economic development.

69/ For each region, the five economies with the largest populations are considered, except for Sub-Saharan Africa, where Mozambique, Ethiopia and Uganda have been excluded because of data limitations.

70/ It should be noted that high investment rates usually reflect high domestic savings. This is so because the difference between investment and domestic savings equals the current account deficit, which rarely exceeds 5 per cent of GDP over longer time periods.

Figure 7. Macroeconomic Indicators for DCs[a]



East Asia: China, Indonesia, Rep. of Korea, Philippines, Thailand; South Asia: Bangladesh, India, Nepal, Pakistan, Sri Lanka; Latin America: Argentina, Brazil, Chile, Colombia, Mexico; Sub-Saharan Africa: Cameroon, Côte d'Ivoire, Ghana, Kenya, Tanzania; Central Europe: Bulgaria, Hungary, Lithuania, Poland, Romania.

[a]Population weighted averages. - [b]Annual average, 1980-1992. - [c]In percent of GDP, average for 1980-1992, in constant international prices. - [d]Excluding Lithuania. - [e]Average years of schooling of the working age population, 1985. - [f]Excluding China. - [g]Excluding Côte d'Ivoire.

Source: Barro, Lee [1993]; Heston et al. [1994]; World Bank [1994c].

In this region, centrally planned investment resulted in allocative distortions so that productivity growth remained sluggish until the regime changed. Moreover, physical capital accumulation is not all that matters. Human capital formation may be even more important as a driving force of economic growth. This is all the more so in the global economy, where the diffusion of new technologies is advanced by declining information and transaction costs. The lower panel in Figure 7, which shows average years of education as an indicator of human capital accumulation, supports this consideration at least partly: Among DCs, East Asia is again the best performing region. This indicator also suggests that Central Europe may have favourable prospects of becoming integrated into the globalization strategies of TNCs.

More systematic evidence for the hypothesis that formal education plays a leading role in explaining economic success comes from recent empirical cross-country studies [Barro 1991; Mankiw et al. 1992; Gundlach 1995]. These studies uniformly confirm that human capital formation is at least as important as physical capital formation in explaining the large differences in *per capita* income between industrialized countries and DCs. They also support theoretical models which predict that economic backwardness is not necessarily a permanent state of affairs. Low-income countries have the chance to realize higher growth rates than rich countries, because they can use existing technologies rather than having to invent them. The predicted and estimated speed of convergence is fairly slow (2 per cent per year or even less), so that this "natural" catching up process alone does not suffice to realize substantial improvements in the standard of living within reasonable periods of time. The East Asian example reveals, however, that there are ways to speed up convergence. Integration into the international division of labour appears to be crucially important in this respect.

Overall, East Asia's success in becoming an attractive location for international businesses seems to be related to a combination of short- and long-run factors which can be shaped by domestic economic policies. Macroeconomic stability is a matter of government budget discipline, the rate of investment is a question of business conditions, and the amount of compulsory formal education reflects the government's attitude towards the provision of public goods. A priori, there is no reason why Asian-type success stories should not happen in other parts of the world, say in Latin America or in Eastern Europe.

The Role of New Technologies

As concerns the future prospects for DCs to participating successfully in globalization, there is widespread agreement that continuous acquisition of technological and managerial know-how is a critical factor. Government policy plays a two-fold role in facilitating technological progress [Agarwal et al. 1995]. First, international trade and exchange rate policies affect many of the channels through which the transfer of foreign technologies may take place. Second, the successful application of new technologies depends on local technological capability, namely the ability to select, adapt, diffuse, and build upon imported technology. Local technological capability, in turn, is influenced by government policy in several areas, most prominently in education.

Different forms of technology transfer may be classified by the demands they make on the user's technological capability and, correspondingly, on the intensity of the relationship between the supplier and the user of the transferred technology. One extreme is represented by FDI in the form of turnkey plants where the new technology is not only supplied by, but also used under the direct control of the parent company. Initially at least, there may be little reliance on local inputs other than labour, and limited scope for technological learning. By contrast, technology licensing and the purchase of equipment embodying new technology involve more of an arm's length relationship between suppliers and users. The efficient use of these channels depends on the user's ability to obtain and process sufficient information to choose among available techniques, and to adapt the new technology to local conditions with only limited support from the supplier. This applies even more strongly to technological information obtained from customers, especially foreign importers, or from sources in the public domain.

Some observers fear that new manufacturing techniques will render it more difficult for DCs to attract foreign capital in the future. New technology encompasses innovations in hardware, such as new machinery, and software, such as organization, business administration, and marketing. To be successfully applied, these new technologies may require complementary human skills which are in short supply in many DCs. Freeman and Hagedoorn [1994] argue that technological capabilities are extremely unevenly distributed in the world economy. About two-thirds of worldwide R&D efforts take place within the Triad, whereas DCs only account for about 5 per cent of global R&D (the rest is mainly military and aerospace R&D by the former Soviet bloc). A similar picture emerges for patents. According to this most frequently applied indicator, the combined share of DCs in global technological output would amount to about 1-3 per cent. However, the minor overall role of DCs in technological development obscures different trends at the regional level. R&D expenditures of Asian NIEs have been growing rapidly in the 1980s, and their patenting activities began to rise. This is in contrast to Latin American DCs, where no improvement could be identified [Freeman, Hagedoorn 1994]. Moreover, the attractiveness of DCs to foreign capital primarily depends on their capabilities in applying existing technologies, rather than on their role in producing technological output. As was shown before, many DCs have made substantial progress in the former respect.

Another question is whether DCs actually receive technologies that fit their factor endowments. What can be expected in a globalizing economy is that NIEs should receive a higher share of advanced technologies than less advanced LDCs. Table 11 provides some empirical evidence derived from the MERIT data base with regard to the relative importance of so-called core technologies in (international) inter-firm technology partnering. It is widely accepted that information technology, biotechnology, and new materials constitute the heart of many future technological developments affecting manufacturing, but also many services. Technology partnering within developed countries, and especially within the Triad, is dominated by these three core technologies. Core technologies account for about half of all partnerships between Triad and NIE companies, while two-thirds of all partnerships involving LDCs are in areas other than core technologies. This pattern supports the view that the focus of technological cooperation is related to factor endowments of partners.

Table 11. The Share of Core Technologies in International Inter-firm Technology Partnering, 1980-1989 (per cent)

	Share of core technologies[a] in:	
	Strategic technological alliances	Technology transfer agreements
Developed countries	73.0	60.9
Triad	73.5	61.4
Triad-NIEs	53.6	52.4
Triad-LDCs	23.4	38.5

[a]Information technology, biotechnology, new materials.

Source: Freeman, Hagedoorn [1994].

From the lower level of technological cooperation between industrialized countries and DCs it cannot be concluded that DCs do not have access to advanced technologies (see Chapter C.1). Rather, inter-firm cooperation in high-tech sectors is a suboptimal means to transfer technology between partners at considerably different stages of economic development. Inter-firm agreements on technology cooperation are just one way of technology transfer. Alternative means appear to be more appropriate for DCs attempting to improve their technological capabilities. Other channels include arm's length types of NEC, imports of machinery and capital goods, and FDI by TNCs.

In some cases, the import of foreign technology by DCs has been complemented by autonomous domestic efforts to develop technology. The Taiwanese computer industry provides an example [San 1992]. Notwithstanding the significant role of the Taiwanese computer industry on world markets, the majority of its constituent enterprises are small or medium sized. These SMEs have responded flexibly to market changes, but are largely incapable of developing advanced technologies on their own. Therefore, the major operators in this industry decided to form a so-called "technology development alliance" in 1989. The aim was to create specific computer chip technologies, which required the establishment of a microelectronic laboratory with high quality standards, and the engagement of more than 200 engineers and technicians. This project was initiated and directed by the government-sponsored Industrial Technology Research Institution, while the costs had to be shared by those firms interested in joining. In the case of Taiwan Province, joint efforts in developing new technology have spread to other industries as well, for instance, to automobile manufacturing and consumer electronics.

Finally, a larger flow of technology through NEC to DCs in the 1980s was hindered by policy disincentives in DCs, rather than by a natural tendency for technology concentration in industrialized countries. Some support for this proposition may be derived from a survey of enterprises which engage in licensing their technology

internationally [Vickery 1988].[71/] One half of all respondents reported that government regulations, foreign exchange controls, and inadequate industrial property rights protection had prevented agreements from being reached; three quarters mentioned that they had caused undue delays.[72/] Enterprises engaged in licensing are typically involved in other kinds of technology transfer activities at the same time, such as joint ventures, sales of technology, and technical service contracts.[73/] This suggests that the same policy-induced obstacles hindering technology flows through licensing are responsible for limited technology flows in other areas of NEC.

Regionalization, Globalization, and Convergence

Some authors claim that there is no general trend towards globalization involving DCs. They argue that a tendency towards regional production and sourcing networks will impair the chances of DCs of benefiting from technology transfers [Oman 1994]. This would imply that DCs face the risk of being excluded from the growth dynamics of globalization, if they do not join regional groupings. The empirical evidence presented above does not support this view. While regional networking does play an important role with respect to both NEC and FDI, Chapters C and D clearly show that global networking, too, is on the rise. Furthermore, the fact that not all DCs have participated in globalization so far cannot be attributed to regionalization. The most dynamic DCs are not those with the closest links to formal regional integration schemes such as NAFTA or EU. Rather, Asian DCs did prosper most rapidly without enjoying preferential treatment in, and locational proximity to, the large European and American markets.

In essence, the main culprit for failing to integrate with the world economy is a misguided domestic economic policy. Yet inappropriate economic policies can be changed. This implies that the trend towards globalization is highly unlikely to lead to a two camp world, where many DCs are caught in a poverty trap. To the contrary, globalization can be expected to further increase the long-run tendency towards factor price equalization. This does not apply only to the mobile factors of production, but increasingly also to the less mobile factors of production, such as labour. The implication for industrialized countries is that wages of low-skilled workers, in particular, will have to decline - not necessarily in absolute amounts, but in relation to wages of high-skilled workers and in relation to the rate of return on capital. Conversely, the implication for DCs is that average wages will rise as the supply of capital increases. This reasoning is supported by the Stolper-Samuelson-Theorem of international trade theory. In practice, it may be difficult to quantify the resulting effects exactly, but it is hard to maintain that growing globalization has nothing to do with labour market problems of rich countries. Once this impact is acknowledged, there must be an impact on DCs, too.

71/ As a general pattern, licensing was found to be concentrated in industrialized countries and Asian DCs.

72/ By contrast, only one quarter of respondents experienced problems in licensing out their technology within their home countries.

73/ For Greece, it was found that licensing was complementary to other forms of technology transfer, mainly through FDI [Giannitsis, 1991]. In many cases, licensing was the preferred instrument for entering the Greek market before deciding on other engagements such as subsidiaries, share participation, or acquisition of licensee firms.

One piece of evidence supporting the presumed labour market impact of globalization comes from economic history. Over the past century and a half, real wages converged between Europe and the developing economies of the day, i.e. Canada, the US, Argentina, and Australia, and also within Europe [Williamson 1995]. Rather strong convergence of real wages for unskilled workers can be observed for 1870-1913, which was a period of comparatively high macroeconomic stability under the gold standard, and of exceptionally high international mobility of labour, capital and goods. The present situation is almost the same, except that labour mobility is restricted. For a tendency towards factor price equalization to prevail, it is sufficient that capital and goods are mobile internationally. In the era of globalization, this is exactly what happens as a result of new technologies and declining transaction costs. The historical record thus suggests that globalization provides excellent opportunities for DCs.

Another piece of evidence comes from observed changes in relative prices. The globalization hypothesis implies that the relative price of goods produced with a relatively large amount of low-skilled labour should decline on world markets, while the relative price of human capital intensive goods should rise. The prediction of trade theory is confirmed at least for the US, which constitutes a relatively large and open market [Leamer 1993; Nunnenkamp et al. 1994]: The relative price of labour-intensive goods like clothing has fallen compared with the prices of human capital intensive goods like automobiles and machinery.

Protectionism in Industrialized Countries

The evidence in favour of the predicted link between globalization and factor price equalization implies favourable opportunities for the DCs to catch up. Nevertheless, globalization also brings with it a threat to DCs, at least in the short run. The reason is protectionism on the part of industrialized countries. Protection aims at increasing the income of the relatively scarce factor of production, i.e. the factor that is most used in imports. Industrialized countries erected trade barriers to preserve jobs in their low-skill industries. Likewise, many DCs applied all sorts of regulations and capital controls in the past, to preserve rents for domestic human and physical capital owners. Yet in both cases, the net result is a loss of welfare, because resources are not allocated efficiently.

Apparently for fear of giving support to protectionist arguments, some economists have tried to downplay the link between globalization and labour markets [Krugman, Lawrence 1994; Lawrence, Slaughter 1993]. This is a somewhat dangerous misconception, however. Instead, it should be emphasized that economic analysis confirms first that there are losers as well as gainers from globalization, and second, that protection is inferior to other ways of supporting the losers [Wood 1995]. This applies to both industrialized countries and DCs. Capital-poor DCs should encourage, rather than restrict, the inflow of capital; capital rich industrialized countries have to change their production structure away from low-skill intensive manufacturing industries towards sophisticated lines of production in which there is less competition from fast growing DCs.

True, the necessary structural change will not come without cost. It may create higher unemployment as long as low-skilled workers do not find new jobs, or turn themselves

into more skilled workers. But it is unlikely that structural change can be halted for long by protection, since capital and technology have become more mobile. Nor does structural change imply that today's rich countries will completely lose their industrial base to newly industrializing DCs. Despite much talk about a general trend towards a service economy, the value added share of manufacturing in GDP (measured at constant prices) is remarkably constant over time for OECD countries [Gundlach 1993]. The same result was found by Kuznets [1966] in his seminal analysis of long run structural change 30 years ago.[74/] Yet what has changed are the employment shares of manufacturing, which steadily decline as a result of stronger productivity growth in this sector than in other sectors such as services. Hence, structural change induced by globalization implies an employment shift towards the service sector in industrialized countries. A similar development will occur in relatively advanced DCs, since they have to cope with the same kind of competition from below as present day industrialized countries.

VI. SUMMARY AND CONCLUSIONS

The current debate on globalization focuses on the implications for labour markets in industrialized countries. Concerns are widespread that earnings and employment prospects, especially of low-skilled workers in these countries, are threatened by intensified worldwide competition in the markets for goods, services, technology and capital. If globalization significantly affects today's leading economies, it follows logically that its impact on the economic prospects of DCs must be far-reaching as well. The DC perspective has been largely ignored in academic and public debate so far.

For DCs, the relevant questions are: Does globalization foster or retard their industrialization? Will fiercer competition and greater mobility of production factors end up in a deepening divide between rich and poor countries? Or is the era of globalization a time of unprecedented opportunity for DCs? Overall, the findings of this study suggest an affirmative answer to the last question. The successful industrialization of many DCs indeed appears to be one of the major *reasons* for globalization. Yet globalization involves risks not only for industrialized countries but also for DCs. Some DCs do face the threat of being delinked from the worldwide division of labour. As a result, their attractiveness to internationally mobile factors of production may decline further, unless domestic policy reforms turn the tide.

Any evaluation of the chances for DCs to benefit from worldwide trends has to consider that globalization proceeds in various ways. Globalization implies first of all that trade expands relative to production, and that FDI grows even faster than trade. However, non-equity forms of international investment cooperation (NEC) - including licensing, joint ventures with foreign minority participation, offshore processing and strategic alliances - must not be ignored. The specific modes applied by enterprises going global mainly depend on industry- and product-specific characteristics, as well as on policy

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74/ For example, the value added share of manufacturing has remained fairly constant at about 20 per cent in the US during 1970-1992, in Germany it declined from 40 to 35 per cent, and in Japan it increased from 26 to 34 per cent. For fast growing DCs, such as the Republic of Korea and Malaysia, this share has strongly increased, thereby largely offsetting the decline in the share of agriculture, whereas no significant changes can be observed for services [World Bank 1994d].

interventions. FDI tends to be preferred as a means to retain full ownership control in industries producing differentiated goods and applying sophisticated technologies. Certain types of NEC may be favoured when human skills are embodied in capital goods and production processes are standardized. Government interference may limit the choices open to enterprises and, thereby, cause substitution effects between different modes of globalization. Basically, however, the evidence suggests that FDI and NEC complement each other.

The opportunities for DCs to become involved in the international division of labour differ between the various modes of globalization. For obvious reasons, their participation in inter-firm agreements on *technology* cooperation is weak at best. This type of NEC is essentially restricted to fairly advanced partners with a similar level of technological capability. Notably joint R & D activities are unlikely to involve DC firms, as a relatively low innovative capacity is just one of the constituent properties of DCs. DC firms play a larger role when it comes to NEC agreements in more mature industries, in which market-related motives underlie most cooperative ventures. This does not imply that DCs are delinked from technology transfers. Rather, inter-firm cooperation is not the optimal means for integrating DCs into globalization strategies related to R & D. Technology transfers between rich and poor countries mainly occur through FDI, which allows the investing firm to maintain control over firm-specific assets.

Recent trends in FDI strongly support the proposition that DCs have become closely integrated into globalization strategies. In the early 1990s, DCs attracted about one-third of worldwide FDI flows. Booming FDI resulted in a tenfold rise in their FDI-to-export ratio since 1980. Various DC groups benefited from this favourable development to a significantly different degree, however. Globalization through FDI proceeded mainly in East and South-East Asia. At the same time, Latin American locations such as Mexico resumed their role in global sourcing and marketing strategies of TNCs, and Central Europe emerged as a new competitor for foreign risk capital. By contrast, the risk of being delinked from globalization trends appears to be particularly large for Sub-Saharan Africa.

The contention that integration into the world economy progressed most rapidly in Asian DCs is underscored by case studies of selected manufacturing industries. At the same time, globalization was not restricted to a narrowly defined group of DCs in the sectors considered:

- Least surprisingly, DCs are hosting a particularly large share of world production in the relatively labour-intensive textiles and clothing industry. More importantly, though, many DCs succeeded in increasing their production share over time, and in achieving international competitiveness in both textiles and clothing. The example of clothing strongly supports the view that even lower-income DCs can join the globalization club. More advanced DCs are increasingly losing their comparative advantage in this particularly labour-intensive segment. These DCs have relocated production to lower-income countries, which then emerged as most competitive suppliers of clothing to OECD markets. Likewise, newcomers in Asia, Latin America and Central Europe have benefited from non-equity forms of production sharing with Japanese, US and EU companies. Their integration into

the worldwide division of labour will be further enhanced with MFA trade being re-integrated into the GATT/WTO framework.

- While some huge OECD-based TNCs continue to dominate globalization in chemicals, DCs have become increasingly involved in this physical capital intensive industry. This refers to relatively advanced Asian NIEs in the first place. Different factor intensities explain why the number of DCs to have successfully penetrated OECD markets is smaller in chemicals than in textiles and clothing. FDI has greatly supported the integration of emerging chemical producers into world markets. In major Asian and Latin American host countries, the chemical industry attracted a significant proportion of overall FDI inflows, ranking first or second among manufacturing industries. High growth projections for Asian chemical markets are likely to further enhance the attractiveness of this region to both FDI and NEC.

- Relatively sophisticated technologies and human skill requirements render it more difficult for DCs to participate in globalized production of motor vehicles. Nevertheless, some advanced DCs have emerged as new competitors in this industry, and their share in world production of both finished cars and auto parts has increased significantly. Especially in Latin America, this is mainly due to globalization through FDI by TNCs based in Triad economies. FDI was less important in Asia, but the development of local automobile production has been supported by establishing international links in this region as well. Licensing and similar inter-firm arrangements were most important in this respect. Whatever the future shape of the world's motor vehicle industry, some non-traditional locations in the Far East, Latin America and Central Europe appear well prepared to meet the competitive challenges.

All in all, the findings of this study contrast with the widespread belief that only a few DCs can benefit from globalization. Rather, the chances of newcomers have been further improved recently, with advanced DCs increasingly becoming *source* countries of FDI. With rising *per capita* income and wages, these countries are shifting towards more sophisticated lines of production and relocating labour-intensive activities in lower-income DCs. This provides the latter with new opportunities for catching up.

Yet the future success of newcomers in joining the globalization club mainly depends on the domestic economic policy framework. Some basic policy conclusions emerge from the experience of the frontrunners among DCs. First, and most obviously, openness towards world markets is a precondition for becoming involved in the globalization strategies of TNCs. Openness has several dimensions:

- Latecomers should join the current trend of liberalizing FDI regulations in order to make use of foreign capital as an engine of economic growth.

- Policy disincentives which discourage foreign companies to transfer technology through licensing and similar arrangements should be removed. This will enable the so far limited inflow of technology by means of NEC to be enlarged.

- Import liberalization is becoming more important in preventing a policy-induced anti-export bias, as outright export subsidies have to be phased out under the new WTO rules. The removal of trade barriers encourages an efficient allocation of resources and, hence, improves locational attractiveness for globalized production.

Second, under conditions of globalized production, national governments are increasingly constrained in pursuing economic policies of their own liking. Experience strongly suggests that DCs characterized by pronounced macroeconomic instability are relatively unattractive locations for international investors. It follows that inflation, which is the most obvious sign of unstable economic conditions, has to be kept at bay. Fiscal consolidation is most important in this respect, as high government budget deficits are typically a major reason for high inflation. Likewise, tax rates, especially business taxes, must be moderate and levied on a broad taxation base, in order not to impair the incentive to invest.

Third, investment in physical and human capital plays a crucial role in enabling DCs to participate in globalization. Enlarging the physical capital stock per worker increases labour productivity, which renders it easier to become internationally competitive and to attract foreign capital. Capital inflows, in turn, may supplement domestic investment funds. In order to benefit from this process of mutually reinforcing factors, economic policies that discourage domestic saving and investment must be avoided. In addition to fiscal and monetary discipline, financial market reforms are highly relevant in this respect, notably in DCs which are still characterized by financial repression and inefficient intermediation between savers and investors. Otherwise, such DCs may end up in a vicious circle of low and unproductive domestic investment and declining attractiveness to foreign capital.

Human capital formation is at least as important as physical capital accumulation. This is all the more so under conditions of globalization, which enhances technological diffusion because of declining transaction and information costs. Governments have an important role to play in attracting new technologies and adjusting to technological change. While the import of technology requires appropriate trade and exchange rate policies, its successful application basically depends on available human skills and, thus, on government efforts towards better education of the workforce.

Finally, globalization has proceeded along with renewed interest in regional integration schemes in both developing and industrialized countries. Clearly, institutionalized links between newcomers to globalization and major economies such as the EU and the US may help the former to become integrated into the international division of labour. Central Europe is a case in point: economic transformation was made easier by preferential trade arrangements and access to foreign capital offered under the association agreements with the EU. This does not imply, however, that DCs deprived of such fortunate external conditions will be excluded from the growth dynamics of globalization. The experiences of Asian DCs, on the one hand, and the ACP group on

the other hand, suggest that institutionalized links to major integration schemes are neither necessary nor sufficient for economic progress. The involvement of Asian DCs in globalization is most advanced, although they remained outside integration schemes. By contrast, ACP countries have not made much progress despite their preferential access to EU markets. Regional integration is no substitute for reforming domestic policies, where these are still inappropriate, in order to reap benefits from globalization. Openness and a sufficient provision of public goods must figure high on the policy agenda.

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