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Annexes to Chapter III

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Annex 1 to chapter III

GROWTH AND CLASSIFICATION OF WORLD MERCHANDISE EXPORTS

This annex provides basic information that underlies the analysis of export dynamism in world merchandise trade. Table 3.A1 lists 225 product categories classified in the Standard International Trade Classification (SITC), Rev. 2, at the 3-digit level. The product groups are ordered according to the average annual growth rate of their export value during the period 1980–1998, which is used as an indication of "market dynamism". The table also classifies each product group into different categories according to the mix of different skill, technology and capital intensities and scale characteristics, as follows:

Primary commodities ..... A

Labour-intensive and resource-based manufactures ..... B

Manufactures with low skill and technology intensity C

Manufactures with medium skill and technology intensity ..... D

Manufactures with high skill and technology intensity ..... E

Unclassified products ..... F

A few SITC items are not considered in the analysis because data for these categories are incomplete. These items are: SITC 286 (ores and concentrates of uranium and thorium), SITC 333 (crude petroleum), SITC 351 (electric current), SITC 675 (iron and steel hoops and strips), SITC 688 (uranium and thorium), SITC 911 (postal packages), SITC 931 (special transactions and unclassified commodities), SITC 961 (coin other than gold coin), and SITC 971 (gold).

Some other items of SITC section 3, namely SITC 322 (coal), SITC 323 (coke and briquettes), SITC 334 and 335 (petroleum products), and SITC 341 (gas) are also not considered because the analysis only covers non-fuel merchandise trade.

Table 3.A2 specifies the most market-dynamic products in the exports of developed countries, developing countries as a group, and the four regional subgroups that are discussed in section E of this chapter. The product groups highlighted in the table are among the 20 most market-dynamic ones on a world scale, as listed in table 3.A1 and also in table 3.1 in the main text.

Table 3.A1

SITC PRODUCT GROUPS: AVERAGE ANNUAL GROWTH OF EXPORT VALUE, 1980–1998, AND CLASSIFICATION ACCORDING TO FACTOR INTENSITY

(Ranked by export value growth)

Rank	SITC code	Product group (SITC nomenclature)	Product category	Average annual export value growth (Per cent)
1	*776*	Thermionic, cold and photo-cathode valves, tubes, and parts	E	16.3
2	*752*	Automatic data processing machines and units thereof	E	15.0
3	*759*	Parts of and accessories suitable for 751, 752	E	14.6
4	*871*	Optical instruments and apparatus	E	14.1
5	*553*	Perfumery, cosmetics and toilet preparations	E	13.3
6	*261*	Silk	A	13.2
7	*846*	Undergarments, knitted or crocheted	B	13.1
8	*893*	Articles of materials described in division 58	D	13.1
9	*771*	Electric power machinery, and parts thereof	D	12.9
10	*898*	Musical instruments, parts and accessories	F	12.6
11	*612*	Manufactures of leather or of composition leather, n.e.s.	B	12.4
12	*111*	Non-alcoholic beverages, n.e.s.	A	12.2
13	*872*	Medical instruments and appliances	E	12.1
14	*773*	Equipment for distributing electricity	D	12.0
15	*764*	Telecommunications equipment, and parts	E	11.9
16	*844*	Undergarments of textile fabrics	B	11.9
17	*048*	Cereal preparations and preparations of flour or starch of fruits or vegetables	A	11.9
18	*655*	Knitted or crocheted fabrics	B	11.7
19	*541*	Medicinal and pharmaceutical products	E	11.6
20	*778*	Electrical machinery and apparatus, n.e.s.	D	11.5
21	*873*	Meters and counters, n.e.s.	E	11.3
22	*514*	Nitrogen-function compounds	E	11.2
23	*098*	Edible products and preparations, n.e.s.	A	11.2
24	*772*	Electrical apparatus such as switches, relays, fuses and plugs	D	11.1
25	*783*	Road motor vehicles, n.e.s.	D	11.1
26	*821*	Furniture and parts thereof	B	11.0
27	*062*	Sugar confectionery and other sugar preparations	A	10.9
28	*592*	Starches, inulin and wheat gluten, albuminoidal substances	E	10.9
29	*761*	Television receivers	E	10.7
30	*812*	Sanitary, plumbing, heating and lighting fixtures	C	10.7
31	*122*	Tobacco, manufactured	A	10.7
32	*679*	Iron and steel castings, forgings and stampings	C	10.7
33	*073*	Chocolate and other food preparations containing cocoa	A	10.7
34	*628*	Articles of rubber, n.e.s.	D	10.6
35	*843*	Outergarments, women's, of textile fabrics	B	10.5
36	*533*	Pigments, paints, varnishes and related materials	E	10.3
37	*635*	Wood manufactures, n.e.s.	B	10.3
38	*847*	Clothing accessories of textile fabrics	B	10.3
39	*657*	Special textile fabrics and related products	B	10.3
40	*664*	Glass	B	10.2
41	*583*	Polymerization and copolymerization products	E	10.1
42	*895*	Office and stationery supplies, n.e.s.	F	10.0
43	*642*	Paper and paperboard, cut to size or shape	B	10.0
44	*621*	Materials of rubber (pastes, plates, sheets)	D	9.9
45	*845*	Outergarments and other articles, knitted	B	9.9
46	*899*	Other miscellaneous manufactured articles	F	9.9
47	*743*	Pumps, compressors, fans and blowers	D	9.8
48	*672*	Ingots and other primary forms, of iron or steel	C	9.8
49	*774*	Electric and radiological apparatus, for medical purposes	D	9.8
50	*842*	Outergarments, men's, of textile fabrics	B	9.8

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Table 3.A1 (continued)

SITC PRODUCT GROUPS: AVERAGE ANNUAL GROWTH OF EXPORT VALUE, 1980–1998, AND CLASSIFICATION ACCORDING TO FACTOR INTENSITY

(Ranked by export value growth)

Rank	SITC code	Product group (SITC nomenclature)	Product category	Average annual export value growth (Per cent)
51	*633*	Cork manufactures	B	9.7
52	*714*	Engines and motors, non-electric	D	9.7
53	*726*	Printing and bookbinding machinery, and parts	D	9.7
54	*551*	Essential oils, perfume and flavour materials	E	9.7
55	*554*	Soap, cleansing and polishing preparations	E	9.7
56	*611*	Leather	B	9.7
57	*749*	Non-electric accessories of machinery	D	9.6
58	*941*	Animals, live, n.e.s., including zoo-animals	F	9.5
59	*728*	Machinery and equipment specialized for particular industries	D	9.5
60	*781*	Passenger motor cars, for transport of passengers and goods	D	9.4
61	*515*	Organo-inorganic and heterocyclic compounds	E	9.4
62	*582*	Condensation, polycondensation and polyaddition products	E	9.4
63	*699*	Manufactures of base metal, n.e.s.	C	9.4
64	*598*	Miscellaneous chemical products, n.e.s.	E	9.3
65	*694*	Nails, screws, nuts and bolts of iron, steel or copper	C	9.2
66	*658*	Made-up articles, wholly or chiefly of textile materials	B	9.2
67	*036*	Crustaceans and molluscs, fresh, chilled, frozen, salted, in brine or dried	A	9.1
68	*894*	Baby carriages and toys	B	9.1
69	*716*	Rotating electric plant and parts	D	9.1
70	*775*	Household type, electrical and non-electrical equipment	D	9.1
71	*245*	Fuel wood (excluding wood waste) and wood charcoal	A	9.0
72	*034*	Fish, fresh (live or dead), chilled or frozen	A	9.0
73	*831*	Travel goods, handbags, briefcases, purses and sheaths	B	9.0
74	*713*	Internal combustion piston engines, and parts	D	8.9
75	*741*	Heating and cooling equipment, and parts	D	8.9
76	*656*	Tulle, lace, embroidery, and small wares	B	8.8
77	*531*	Synthetic organic dyestuffs, etc., natural indigo and colour lakes	E	8.8
78	*744*	Mechanical handling equipment, and parts	D	8.7
79	*792*	Aircraft and associated equipment, and parts	E	8.7
80	*784*	Parts and accessories of 722, 781, 782, 783	D	8.7
81	*269*	Old clothing and other old textile articles; rags	A	8.7
82	*874*	Measuring, checking, analysing instruments	E	8.7
83	*684*	Aluminium	A	8.6
84	*037*	Fish, crustaceans and molluscs, prepared or preserved, n.e.s.	A	8.6
85	*742*	Pumps for liquids, liquid elevators, and parts	D	8.6
86	*663*	Mineral manufactures, n.e.s.	B	8.6
87	*848*	Articles of apparel and clothing accessories, non-textile	B	8.6
88	*897*	Jewellery, goldsmiths and other articles of precious materials	F	8.6
89	*641*	Paper and paperboard	B	8.5
90	*725*	Machinery for paper and pulp mills and paper manufactures	D	8.5
91	*892*	Printed matter	F	8.5
92	*653*	Fabrics, woven, of man-made fibres	B	8.5
93	*634*	Veneers, plywood, improved or reconstituted wood	B	8.4
94	*513*	Carboxylic acids, and their anhydrides, halides, and derivatives	E	8.4
95	*516*	Other organic chemicals	E	8.4
96	*273*	Stone, sand and gravel	A	8.3
97	*112*	Alcoholic beverages	A	8.3
98	*785*	Motorcycles, motor scooters and invalid carriages	C	8.3
99	*512*	Alcohols, phenols, phenol-alcohols, and their derivatives	E	8.2
100	*665*	Glassware	B	8.2

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Table 3.A1 (continued)

SITC PRODUCT GROUPS: AVERAGE ANNUAL GROWTH OF EXPORT VALUE, 1980–1998, AND CLASSIFICATION ACCORDING TO FACTOR INTENSITY

(Ranked by export value growth)

Rank	SITC code	Product group (SITC nomenclature)	Product category	Average annual export value growth (Per cent)
101	*054*	Vegetables, fresh, chilled, frozen or simply preserved; roots, tubers	A	8.1
102	*091*	Margarine and shortening	A	8.1
103	*625*	Rubber tyres, tyre cases, for wheels of all kinds	D	8.0
104	*786*	Trailers and other vehicles, not motorized	C	8.0
105	*884*	Optical goods, n.e.s.	E	7.9
106	*292*	Crude vegetable materials, n.e.s.	A	7.8
107	*692*	Metal containers for storage and transport	C	7.8
108	*737*	Metalworking machinery, and parts	D	7.7
109	*431*	Animal and vegetable oils and fats, processed	A	7.7
110	*058*	Fruit preserves and fruit preparations	A	7.7
111	*851*	Footwear	B	7.7
112	*654*	Textile fabrics, woven, other than cotton man-made fibres	B	7.6
113	*682*	Copper	A	7.6
114	*667*	Pearls, precious and semi-precious stones, unworked or worked	B	7.5
115	*532*	Dyeing and tanning extracts; synthetic tanning materials	E	7.5
116	*652*	Cotton fabrics, woven	B	7.5
117	*695*	Tools for use in hand or in machines	C	7.5
118	*689*	Miscellaneous non-ferrous base metals employed in metallurgy	A	7.4
119	*881*	Photographic apparatus and equipment, n.e.s.	E	7.4
120	*282*	Waste and scrap metal of iron or steel	A	7.3
121	*727*	Food processing machines, and parts	D	7.3
122	*014*	Meat and edible meat offals, prepared or preserved, n.e.s.; fish extracts	A	7.3
123	*024*	Cheese and curd	A	7.3
124	*762*	Radio-broadcast receivers	E	7.3
125	*291*	Crude animal materials, n.e.s.	A	7.2
126	*745*	Other non-electrical machinery, tools, apparatus, and parts	D	7.1
127	*662*	Clay construction materials and refractory construction materials	B	7.1
128	*022*	Milk and cream	A	7.1
129	*696*	Cutlery	C	7.1
130	*882*	Photographic and cinematographic supplies	E	7.1
131	*057*	Fruit and nuts (excluding oil nuts), fresh or dried	A	7.0
132	*011*	Meat and edible meat offals, fresh, chilled or frozen	A	6.9
133	*736*	Machine tools for working metal or metal carbides, and parts	D	6.9
134	*248*	Wood, simply worked, and railway sleepers of wood	A	6.9
135	*423*	Fixed vegetable oils, soft, crude, refined or purified	A	6.9
136	*674*	Universals, plates and sheets, of iron or steel	C	6.8
137	*661*	Lime, cement, and fabricated construction materials	B	6.8
138	*686*	Zinc	A	6.8
139	*697*	Household equipment of base metal, n.e.s.	C	6.7
140	*683*	Nickel	A	6.6
141	*288*	Non-ferrous base metal waste and scrap, n.e.s.	A	6.6
142	*791*	Railway vehicles and associated equipment	C	6.6
143	*885*	Watches and clocks	E	6.6
144	*724*	Textile and leather machinery and parts	D	6.5
145	*651*	Textile yarn	B	6.4
146	*666*	Pottery	B	6.3
147	*523*	Other inorganic chemicals	E	6.3
148	*659*	Floor coverings	B	6.2
149	*677*	Iron or steel wire, whether or not coated	C	6.1
150	*591*	Disinfectants, insecticides, fungicides, weedkillers	E	6.0

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Table 3.A1 (continued)

SITC PRODUCT GROUPS: AVERAGE ANNUAL GROWTH OF EXPORT VALUE, 1980–1998, AND CLASSIFICATION ACCORDING TO FACTOR INTENSITY

(Ranked by export value growth)

Rank	SITC code	Product group (SITC nomenclature)	Product category	Average annual export value growth (Per cent)
151	*763*	Gramophones, dictating and sound recorders	E	6.0
152	*671*	Pig iron, spiegeleisen, sponge iron, iron or steel	C	6.0
153	*896*	Works of art, collectors' pieces and antiques	F	6.0
154	*522*	Inorganic chemical elements, oxides and halogen salts	E	5.7
155	*424*	Other fixed vegetable oils, fluid or solid, crude, refined or purified	A	5.7
156	*244*	Cork, natural, raw and waste (including in blocks or sheets)	A	5.7
157	*782*	Motor vehicles for transport of goods materials	D	5.7
158	*751*	Office machines	E	5.6
159	*693*	Wire products and fencing grills	C	5.5
160	*056*	Vegetables, roots and tubers, prepared or preserved, n.e.s.	A	5.5
161	*081*	Feeding stuff for animals (not including unmilled cereals)	A	5.5
162	*267*	Other man-made fibres suitable for spinning and waste	A	5.4
163	*721*	Agricultural machinery and parts	D	5.4
164	*718*	Other power generating machinery and parts	D	5.3
165	*572*	Explosives and pyrotechnic products	E	5.2
166	*562*	Fertilizers, manufactured	E	5.0
167	*793*	Ships, boats and floating structures	C	5.0
168	*035*	Fish, dried, salted or in brine; smoked fish	A	4.9
169	*673*	Iron and steel bars, rods, angles, shapes and sections	C	4.9
170	*251*	Pulp and waste paper	A	4.9
171	*075*	Spices	A	4.8
172	*001*	Live animals, chiefly for food	A	4.7
173	*676*	Rails and railway track construction material	C	4.6
174	*246*	Pulpwood (including chips and wood waste)	A	4.5
175	*233*	Synthetic rubber latex; synthetic rubber and reclaimed rubber; waste and scrap	A	4.5
176	*263*	Cotton	A	4.5
177	*266*	Synthetic fibres suitable for spinning	A	4.4
178	*211*	Hides and skins (except fur skins), raw	A	4.4
179	*042*	Rice	A	4.4
180	*511*	Hydrocarbons, n.e.s., and their halogenated or derivatives	E	4.4
181	*712*	Steam and other vapour power units, steam engines	D	4.2
182	*277*	Natural abrasives, n.e.s. (including industrial diamonds)	A	4.2
183	*247*	Other wood in the rough or roughly squared	A	4.2
184	*711*	Steam and other vapour generating boilers, and parts	D	4.2
185	*278*	Other crude minerals	A	4.1
186	*287*	Ores and concentrates of base metals, n.e.s.	A	3.9
187	*691*	Structures and parts of structures; iron, steel and aluminium	C	3.8
188	*223*	Oil-seeds and oleaginous fruit, whole or broken (non-defatted flours and meals)	A	3.7
189	*047*	Other cereal meals and flours	A	3.6
190	*025*	Eggs and yolks, fresh, dried or otherwise preserved, sweetened or not	A	3.5
191	*046*	Meal and flour of wheat and flour of meslin	A	3.5
192	*723*	Civil engineering and contractors plant and parts	D	3.5
193	*121*	Tobacco, unmanufactured; tobacco refuse	A	3.4
194	*012*	Meat and edible meat offals (except poultry liver), salted, in brine, dried or smoked	A	3.2
195	*678*	Tubes, pipes and fittings, of iron or steel	C	3.1
196	*722*	Tractors fitted or not with power take-offs	D	3.0
197	*222*	Oil-seeds and oleaginous fruit, whole or broken (excluding flours and meals)	A	2.9
198	*883*	Cinematograph film, exposed and developed, negative or positive	E	2.8
199	*074*	Tea and maté	A	2.8
200	*061*	Sugar and honey	A	2.6

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Table 3.A1 (concluded)

SITC PRODUCT GROUPS: AVERAGE ANNUAL GROWTH OF EXPORT VALUE, 1980–1998, AND CLASSIFICATION ACCORDING TO FACTOR INTENSITY

(Ranked by export value growth)

Rank	*SITC code*	*Product group (SITC nomenclature)*	*Product category*	*Average annual export value growth (Per cent)*
201	*685*	Lead	A	2.4
202	*072*	Cocoa	A	2.4
203	*281*	Iron ore and concentrates	A	2.4
204	*584*	Regenerated cellulose; cellulose nitrate and other cellulose esters	E	2.4
205	*951*	Armoured fighting vehicles, arms of war and ammunition	F	2.3
206	*681*	Silver, platinum and other metals of the platinum group	A	1.9
207	*265*	Vegetable textile fibres and waste of such fibres	A	1.7
208	*232*	Natural rubber latex; natural rubber and similar natural gums	A	1.6
209	*524*	Radioactive and associated materials	E	1.5
210	*023*	Butter	A	1.3
211	*071*	Coffee and coffee substitutes	A	1.3
212	*411*	Animal oils and fats	A	1.0
213	*041*	Wheat (including spelt) and meslin, unmilled	A	0.4
214	*044*	Maize (corn), unmilled	A	0.3
215	*268*	Wool and other animal hair (excluding wool tops)	A	0.3
216	*613*	Fur skins, tanned or dressed, pieces or cuttings of fur skin	B	-0.1
217	*043*	Barley, unmilled	A	-0.4
218	*289*	Ores and concentrates of precious metals; waste and scrap	A	-0.6
219	*045*	Cereals, unmilled (other than wheat, rice, barley and maize)	A	-1.0
220	*271*	Fertilizers, crude	A	-1.0
221	*212*	Fur skins, raw (including astrakhan, caracul and similar skins)	A	-2.4
222	*585*	Other artificial resins and plastic materials	E	-2.9
223	*264*	Jute and other textile bast fibres, n.e.s., raw or processed	A	-3.0
224	*687*	Tin	A	-3.9
225	*274*	Sulphur and unroasted iron pyrites	A	-5.8

Source: UNCTAD secretariat calculations, based on UN/DESA, *Commodity Trade Statistics* database.

Table 3.A2

LEADING MARKET-DYNAMIC PRODUCTS BY EXPORTING REGION, RANKED BY AVERAGE ANNUAL EXPORT VALUE GROWTH, 1980–1998

Rank	SITC code	Product group	Rank	SITC code	Product group
		Developed countries			***Developing countries***
1	*776*	**Transistors and semiconductors**	1	*752*	**Computers**
2	*844*	**Textile undergarments**	2	*871*	**Optical instruments**
3	*553*	**Perfumery and cosmetics**	3	*759*	**Parts of computers and office machines**
4	*871*	**Optical instruments**	4	*582*	Condensation products
5	*752*	**Computers**	5	*741*	Heating and cooling equipment, and parts
6	*893*	**Plastic articles**	6	*655*	**Knitted fabrics**
7	*759*	**Parts of computers and office machines**	7	*531*	Synthetic organic dyestuffs
8	*898*	**Musical instruments and records**	8	*773*	**Electricity distribution equipment**
9	*541*	**Pharmaceutical products**	9	*712*	Steam engines and turbines
10	*846*	**Knitted undergarments**	10	*781*	Passenger motor vehicles
11	*872*	**Medical instruments**	11	*872*	**Medical instruments**
12	*048*	**Cereal preparations**	12	*763*	Sound recorders
13	*111*	**Non-alcoholic beverages**	13	*583*	Polymerization products
14	*764*	**Telecom equipment, and parts**	14	*776*	**Transistors and semiconductors**
15	*771*	**Electric power machinery**	15	*771*	**Electric power machinery**
16	*783*	Buses and tractors	16	*679*	Iron and steel castings
17	*098*	Preserved food	17	*774*	Medical apparatus
18	*514*	Nitrogen-function compounds	18	*592*	Starch, inulin, gluten, albuminoidal substances
19	*873*	Meters and counters	19	*516*	Other organic chemicals
20	*073*	Chocolate	20	*761*	Television sets
		First-tier NIEs			***ASEAN-4***
1	*752*	**Computers**	1	*752*	**Computers**
2	*277*	Natural abrasives	2	*759*	**Parts of computers and office machines**
3	*783*	Buses and tractors	3	*871*	**Optical instruments**
4	*951*	War firearms and ammunition	4	*763*	Sound recorders
5	*871*	**Optical instruments**	5	*672*	Iron or steel ingots and forms
6	*592*	Starch, inulin, gluten, albuminoidal substances	6	*751*	Office machines
7	*781*	Passenger motor vehicles	7	*716*	Rotating electric plant and parts
8	*611*	Leather	8	*511*	Hydrocarbons
9	*212*	Raw furskins	9	*277*	Natural abrasives
10	*582*	Condensation products	10	*761*	Television sets
11	*882*	Photographic and cinematographic supplies	11	*785*	Cycles and motor cycles
12	*682*	Copper	12	*773*	**Electricity distribution equipment**
13	*759*	**Parts of computers and office machines**	13	*267*	Other man-made fibres
14	*686*	Zinc	14	*786*	Non-motor vehicles
15	*513*	Carboxylic acids	15	*775*	Household equipment
16	*524*	Radioactive materials	16	*641*	Paper and paperboard
17	*122*	Manufactured tobacco	17	*592*	Starch, inulin, gluten, albuminoidal substances
18	*712*	Steam engines and turbines	18	*677*	Iron or steel wire
19	*774*	Medical apparatus	19	*781*	Passenger motor vehicles
20	*515*	Organo-inorganic compounds	20	*268*	Wool and animal hair

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Table 3.A2 (concluded)

LEADING MARKET-DYNAMIC PRODUCTS BY EXPORTING REGION, RANKED BY AVERAGE ANNUAL EXPORT VALUE GROWTH, 1980–1998

Rank	SITC code	Product group	Rank	SITC code	Product group
		South Asia			***South America***
1	*761*	Television sets	1	*245*	Fuel wood and charcoal
2	*752*	**Computers**	2	*682*	Copper
3	*582*	Condensation products	3	*292*	Crude vegetable materials
4	*674*	Iron or steel universals, plates and sheets	4	*098*	Preserved food
5	*515*	Organo-inorganic compounds	5	*014*	Meat preparations
6	*655*	**Knitted fabrics**	6	*121*	Unmanufactured tobacco
7	*266*	Synthetic fibres for spinning	7	*524*	Radioactive materials
8	*672*	Iron or steel ingots and forms	8	*716*	Rotating electric plant and parts
9	*871*	**Optical instruments**	9	*678*	Iron or steel tubes, pipes and fittings
10	*759*	**Parts of computers and office machines**	10	*812*	Plumbing, heating, and lighting equipment
11	*673*	Iron and steel bars and rods	11	*523*	Other inorganic chemicals
12	*513*	Carboxylic acids	12	*111*	**Non-alcoholic beverages**
13	*661*	Lime, cement and building products	13	*845*	Knitted outergarments
14	*583*	Polymerization products	14	*951*	War firearms and ammunition
15	*514*	Nitrogen-function compounds	15	*713*	Internal combustion piston engines and parts
16	*277*	Natural abrasives	16	*045*	Unmilled cereals
17	*511*	Hydrocarbons	17	*671*	Pig iron
18	*683*	Nickel	18	*046*	Wheat meal or flour
19	*898*	Musical instruments and records	19	*551*	Essential oils, perfume and flavour materials
20	*781*	Passenger motor vehicles	20	*655*	**Knitted fabrics**

Source: See table 3.A1.

Note: The product groups highlighted are among the 20 most market-dynamic ones on a world scale, as listed in table 3.A1 of this annex and table 3.1 in the main text.

Annex 2 to chapter III

UNITED STATES TRADE PRICES AND DYNAMIC PRODUCTS

This annex uses the data available on United States export and import prices to assess the extent to which the results reported in section B on dynamic products change when exports are measured at constant prices. The United States Bureau of Labor Statistics (BLS) began developing and publishing annual indices for import and export prices for United States merchandise and services trade in 1989 (monthly indices have been published since January 1993). In preparing these, the BLS has tried to ensure that the prices used refer to products of unchanged quality in terms of technical specification. Where there are significant changes in specification, an adjustment is made to ensure that "the index reflects only actual or 'pure' price changes and is not moved by quality changes" (BLS, 1997: 156).

Chart 3.A1 shows the evolution of United States export and import price indices for four of the most dynamic products in world markets (see section B and annex 1).[1] Of these, import prices of both computers, and parts of computers and office machines have been more volatile than their export prices, and they showed a steep decline during the period 1995–1998. Similarly, for telecommunications equipment, the import price index declined between 1981 and 1985, recovered sharply in subsequent years, and again fell at a steeper rate than export prices after 1995. For such items as transistors and semiconductors, import and export price indices moved more or less together on a downward trend until 1995, but thereafter the import price index fell considerably more sharply than the export price index.

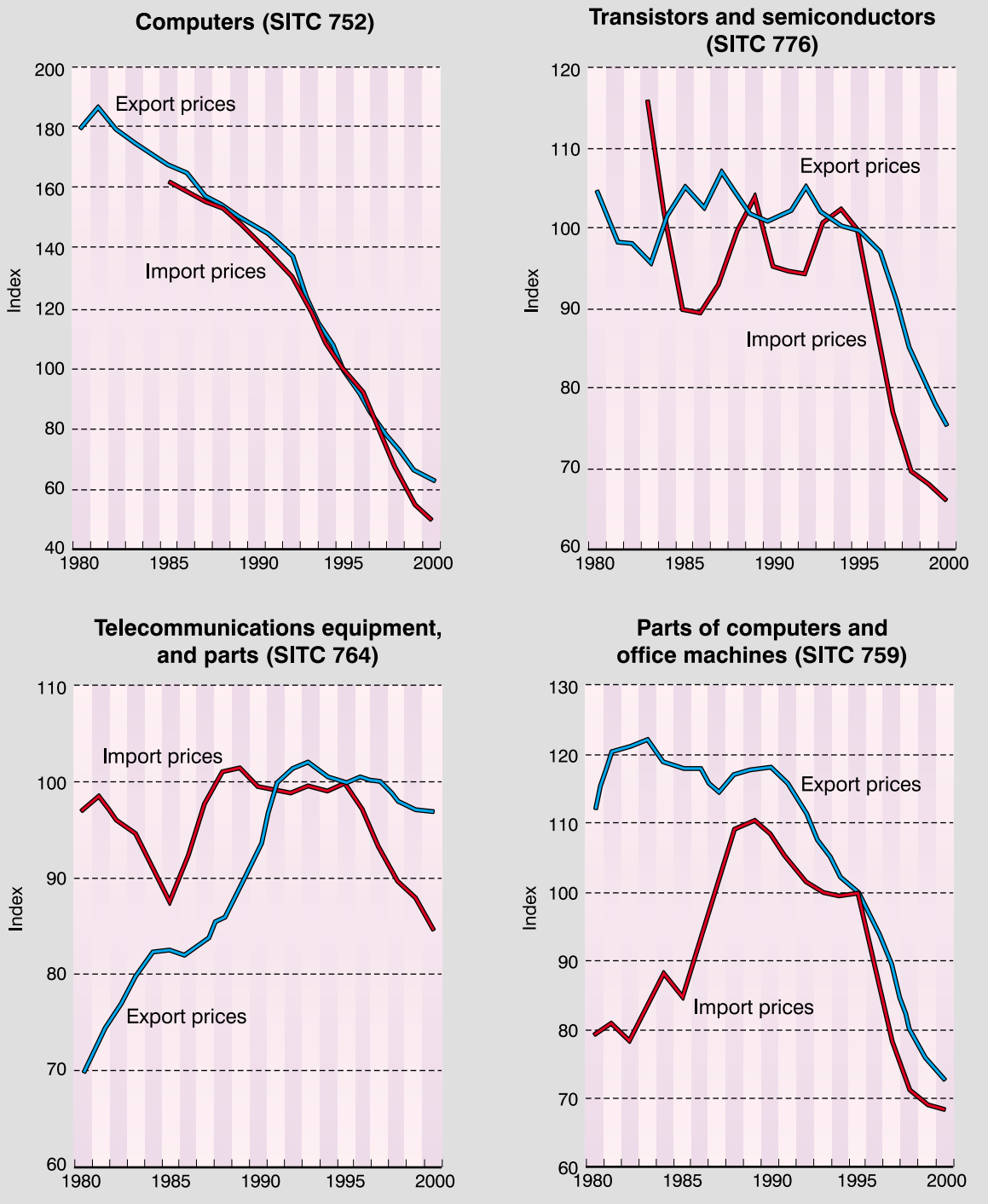
An examination of United States trade statistics suggests that the export price index can be taken as a proxy for prices in trade among developed countries, and the import price index as a proxy for developing countries' export prices. In 1998, in value terms, developing countries accounted for about two thirds of total United States imports of computers, parts of computers and office machines, and transistors and semiconductors, and for about 60 per cent of United States imports of telecommunications equipment. Two thirds of total United States computer exports and exports of parts of computers and office machines went to developed countries, which were also the destination for about half of all United States exports of telecommunications equipment, and one fourth of its exports of transistors and semiconductors; of the latter products, over 70 per cent went to developing countries. Using the United States import prices as a proxy, the evidence presented in chart 3.A1 suggests that developing country export prices for the four dynamic products have been subject to a higher degree of volatility over the past two decades, and that they also experienced steeper falls after 1995 than the export and import prices of the same products traded among developed countries.

The BLS data do not allow for a comprehensive estimation of export growth in constant prices.

Chart 3.A1

UNITED STATES IMPORT AND EXPORT PRICE INDICES FOR SELECTED ELECTRONICS PRODUCTS, 1980–2000

(Index numbers, 1995 = 100)



Source: UNCTAD secretariat calculations, based on data from the United States Department of Labor (www.bls.gov/datahome.htm).

The available data show that there have been sharp declines in both export and import prices of computers and office equipment (SITC 75). The steepest decline in this product division was in the import price index of computers, which steadily fell from 163 in 1985 to 50 in 2000. Prices of telecommunications, audio and video equipment (SITC 76), and electrical machinery and appliances (SITC 77) also declined. However, the decline was only in their import price index and it was relatively moderate (from 106 in 1980 to 84 in 2000 for the former, and from 85 in 1981 to 83 in 2000 for the latter).[2] Within the latter division, it declined the most for transistors and semiconductors (from 116 in 1983 to 66 in 2000). The strongest fall in the import price index after 1995 was recorded for computers, followed by transistors and semiconductors.

These observations suggest that the rate of export growth in computers, parts of computers and office machines, and transistors and semiconductors would dwarf export growth in other products if exports could be expressed in terms of constant prices. On the other hand, they also show that the ranking of products reported in section B would not change significantly. ■

Notes

1 The indices are annual data obtained by averaging BLS's monthly or quarterly data, depending on data availability.

2 Tropical beverages is the only other product item at the 2-digit SITC level in the BLS import price database for which the index value in 1980 was higher than in 2000 (98 in 1980 compared to 58 in 2000).

Annex 3 to chapter III

INTERNATIONAL PRODUCTION NETWORKS AND INDUSTRIALIZATION IN DEVELOPING COUNTRIES

This annex examines how international production sharing has influenced the process of industrialization and growth in developing countries. It concentrates on three sectors that have been important in international production networks involving developing countries in recent years. These sectors, however, differ in the way they operate: the clothing sector is based on subcontracting, the electronics sector is governed by TNCs, and the automobile sector is strongly influenced by preferential trade agreements.

1. Outsourcing: the clothing sector

While FDI has played some role, the major form of production relocation in the clothing sector has been outsourcing.[1] Compared to traditional arm's-length transactions, outsourcing entails greater stability in business relationships and better provision of information in the form of detailed instructions and specifications. The leading actors in such inter-firm networks, based on a contractual relationship, are large retailers of standardized products and brand-name merchandisers of private label products. While the former tend to rely on global production networks based on agreements to purchase the final product from a local producer (full package subcontracting), the latter tend to create regional production networks, where the leading firm delivers semi-finished products to a subcontractor and buys back the finished product (assembly subcontracting).

Industrialization in many developing countries has focused on textiles and clothing. As a labour-intensive sector, clothing provides signifi-

cant job opportunities in labour-abundant economies which have a comparative advantage due to lower wages. Moreover, for over 20 years the quota regulations of the Multi-Fibre Arrangement (MFA) have enabled latecomers to access markets for clothing and textiles once competing countries have filled their MFA quotas. More recently, improvements in production and communication technologies and falling transport costs have enabled geographical separation of the labour-intensive segments from the skill- and capital-intensive segments of the manufacturing process in textiles and clothing. For example, while growing automation has increased the capital-intensity of the pre-assembling stages of the production process, the assembling stages have remained relatively labour-intensive. As a result, it has become both technically feasible and economically profitable for high-wage country manufacturers to relocate their assembling stages of production to low-wage countries and to re-import the end products for domestic sale or for export to third markets.

The benefits of international production sharing in clothing for technology transfer and industrialization vary according to whether outsourcing involves full-package agreements or simple assembly subcontracting.

The benefits of international production sharing in clothing for technology transfer and industrialization in developing countries have been uneven. They vary, in particular, according to whether outsourcing involves full-package agreements or simple assembly subcontracting. For example, the East Asian economies have gone through a sequence, from assembly to full-package operations and, in some cases, to original brand manufacturing; in Mexico there has been an ongoing transition from assembly to a more full-package type of production, favoured by regulations under NAFTA; and the Caribbean countries have continued to perform labour-intensive assembly operations that generate few benefits for their local economies, except low-wage employment (ECLAC, 1999).

The first-tier NIEs in East Asia were the first to establish production facilities under outsourcing agreements with large United States retailers and brand-name merchandisers. Local producers conducted simple assembly activities for a short period of time before moving rapidly to a system of brand-name subcontracting, whereby they produced according to designs specified by the buyer. Many firms proceeded further to original brand-name manufacturing. This was facilitated by a number of factors, including the specialization of East Asian exporters in a wide array of fabrics favoured by women's wear branded marketers, and the geographical distance from the United States which made the use of United States textiles impractical. As trade regulations in destination markets became increasingly restrictive, and rising costs and appreciating exchange rates began to constrain the competitiveness of local producers, many firms in the first-tier NIEs started to concentrate on skill-intensive activities and to outsource the labour-intensive operations of clothing production to their lesser developed neighbours where wages were lower. Social and cultural factors (such as a common language) appear to have been important in their choice of countries for relocation.

Outsourcing, together with the quota advantages of the new assembly sites, has given rise to a triangular manufacturing system, whereby firms of the first-tier NIEs export directly to the United States from their lower-wage sites in neighbouring countries. Thus the first-tier NIEs have sustained their involvement in world trade in textiles and clothing through industrial upgrading: from cheap standardized goods to expensive differentiated goods, from simple assembly of imported inputs to integrated forms of production with greater forward and backward linkages, and from bilateral interregional trade flows to a more fully developed intraregional division of labour incorporating all phases of production and marketing. However, since triangular manufacturing involves considerable coordination costs, without further industrial upgrading the first-tier NIEs may face increased competition from those less advanced Asian countries that have the potential to upgrade from assembling to full-package manufacturing.

The East Asian experience in outsourcing contrasts sharply with that of Mexico and the Caribbean countries. The participation of the latter countries in international production sharing was stimulated by the stiff competition that United States brand-name manufacturers faced from Asian producers. They provided attractive locations because of low wages, which continues to be a key factor in their participation in production sharing in clothing. Furthermore, they benefit from preferential market access provided under Chapter 98 of the Harmonized Tariff Schedule of the United States. However, Mexico has a greater advantage owing to the rules of origin of NAFTA, whereby its inputs into goods for export count as North American inputs and, therefore, are not taxed at the United States border. Caribbean countries, on the other hand, operate under the United States production sharing mechanism, which, while offering privileged access to the United States market, taxes non-United States inputs. The incorporation of competitive Mexican inputs into final products destined for export markets (USITC, 1999b: 30) provides an opportunity to deepen integration, but this will depend on the evolution of competitiveness of the Mexican textiles industry. By contrast, producers in the Caribbean countries have not progressed beyond simple assembly-type processes. After the phasing out of the Agreement on Textiles and Clothing (ATC) of the World Trade Organization (WTO), they are likely to face strong competition from exporters in South Asia and China, which may lead to a race to the bottom in wage cuts and other incentives needed to attract outsourcing contracts.

Without further industrial upgrading the first-tier NIEs may face increased competition from those less advanced Asian countries that have the potential to upgrade from assembling to full-package manufacturing.

The outsourcing agreements have had a strong impact on the direction of trade in clothing. The evidence presented in table 3.A3 indicates a sizeable increase in two-way trade between the core countries of the EU (EU-8) and their neighbouring regions at different levels of per capita income (European periphery, Eastern Europe and North Africa), on the one hand, and that between the United States and Mexico and the Caribbean countries, on the other. In all these cases, except for the bilateral trade between the United States and the Caribbean countries, the increase in exports from poorer to richer countries exceeds that of the reverse trade flows. There was a sharp decline in apparel imports by the United States and the EU-8 (and later also by Japan) from the first-tier NIEs, accompanied by a sharp increase in their imports from the ASEAN-4 and, in particular, China. There is also a sizeable increase in two-way trade between the first-tier NIEs and China. These findings document both the tendency towards regionalization in the clothing trade and the emergence of triangular manufacturing centred on the first-tier NIEs.

Table 3.A3

BILATERAL TRADE IN APPAREL AND CLOTHING ACCESSORIES BETWEEN SELECTED TRADING PARTNERS, 1980–1998

(Percentage shares in total world exports)

	1980	*1985*	*1990*	*1995*	*1998*
Exports of EU-8 to:					
EU-8	26.2	17.0	17.5	13.1	12.4
European periphery	1.5	1.1	2.3	2.3	2.4
Eastern Europe	0.3	0.2	0.3	1.0	1.1
First-tier NIEs	0.3	0.3	0.7	1.1	0.6
ASEAN-4	0.0	0.0	0.0	0.0	0.0
China	0.0	0.0	0.0	0.0	0.0
North Africa	0.3	0.2	0.3	0.4	0.5
Imports of EU-8 from:					
European periphery	3.3	5.4	6.8	6.2	5.6
Eastern Europe	0.8	0.5	0.7	4.2	4.6
First-tier NIEs	9.3	5.2	4.8	2.6	2.0
ASEAN-4	1.0	0.7	1.9	1.7	1.3
China	0.0	0.6	0.9	1.5	1.5
North Africa	1.3	1.0	1.8	2.0	1.9
Exports of United States to:					
First-tier NIEs	0.1	0.0	0.0	0.1	0.0
ASEAN-4	0.0	0.0	0.0	0.0	0.0
China	0.0	0.0	0.0	0.0	0.0
Mexico	0.5	0.4	0.4	0.9	1.5
Caribbean	0.7	0.6	0.8	1.7	2.2
Imports of United States from:					
First-tier NIEs	11.8	17.9	10.9	6.2	5.6
ASEAN-4	0.5	1.8	2.1	2.8	3.6
China	0.0	1.2	1.1	2.1	2.2
Mexico	0.0	0.5	0.1	1.8	3.8
Caribbean	0.0	0.8	0.2	0.7	0.6
Exports of Japan to:					
First-tier NIEs	0.1	0.2	0.1	0.1	0.1
ASEAN-4	0.0	0.0	0.0	0.0	0.0
China	0.0	0.0	0.0	0.1	0.0
Imports of Japan from:					
First-tier NIEs	2.2	2.4	3.4	1.7	0.7
ASEAN-4	0.1	0.0	0.4	0.7	0.4
China	0.0	0.8	1.3	5.0	4.4
Exports of first-tier NIEs to:					
China	0.0	0.1	0.3	0.6	1.2
Imports of first-tier NIEs from:					
China	0.0	0.6	4.7	4.9	6.1

Source: UNCTAD secretariat calculations, based on UN/DESA, *Commodity Trade Statistics* database.

Note: Data in this table relates to SITC 84. The composition of the regional/subregional groups is as follows:
EU-8: Belgium, Denmark, France, Germany, Italy, Luxembourg, the Netherlands, United Kingdom.
European periphery: Greece, Ireland, Portugal, Spain, Turkey.
Eastern Europe: Bulgaria, Czech Republic (1995 and 1998), Czechoslovakia (1980–1990), Estonia (1995 and 1998), Hungary, Latvia (1995 and 1998), Lithuania (1995 and 1998), Poland, Romania, Slovakia (1995 and 1998), Slovenia.
Caribbean: Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, Netherlands Antilles, Nicaragua, Panama, St Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago.
First-tier NIEs: Hong Kong (China), Republic of Korea, Singapore, Taiwan Province of China.
ASEAN-4: Indonesia, Malaysia, the Philippines, Thailand.
North Africa: Egypt, Morocco, Tunisia.

2. Production networks driven by TNCs: the electronics industry

The electronics industry is arguably the most globalized of all industries. Trade in electronics products is underpinned by an increasing geographic dispersion of TNC-driven production networks. Developing economies, notably in East Asia, have been playing a growing role in such networks, and electronics products now account for a significant proportion of their exports. They therefore provide an interesting case to assess the scope for industrial upgrading in the context of international production networks.

The electronics industry is the single most important sector for investment by both Japanese and United States TNCs in East Asia; during the early 1990s it accounted for about 45 per cent of the total manufacturing FDI of Japan and 25 per cent of that of the United States (Ernst and Ravenhill, 1999: 36). United States producers of semiconductors and computer equipment started to invest in export-oriented, labour-intensive assembly production in East Asia in the late 1960s, taking advantage of the low cost of labour there. Subsequently, United States producers and mass merchandisers of household appliances started to outsource an increasing variety of such products to independent suppliers in East Asia. As discussed in detail in *TDR 1996*, export-oriented Japanese TNCs began to shift their production bases offshore in the mid-1980s as they came under heavy pressure from a rising yen and increased protectionist tendencies in other major industrialized countries. The East Asian countries offered attractive locations because of their relatively low labour costs, high levels of education and skills, and good physical infrastructure, and because exports from these countries did not face the same increase in protectionist barriers as exports from Japan.

There appear to be significant differences in the way Japanese and United States TNCs organize their production networks in East Asia.

Even though there is little detailed comparative empirical evidence, there appear to be significant differences in the way Japanese and United States TNCs organize their production networks in East Asia, particularly with regard to the location of management, the sourcing of components and capital goods, the replication of production networks, and the motive for investing abroad (Belderbos, Capannelli and Fukao, 2001; Ernst and Ravenhill, 1999).

The traditional Japanese corporate management system relies much more on intra-firm cooperative arrangements within vertically integrated conglomerates (*keiretsu)* than the United States management system, which relies on market-based relationships with relatively more independ-

ent affiliates. Consequently, Japanese affiliates are less likely to employ local managers or local personnel in senior technical tasks than their United States counterparts. For the same reason, Japanese companies are also more reluctant to transfer research and development (R&D) activities to overseas subsidiaries. High coordination costs and slow interaction between producers and customers are major drawbacks of the Japanese system. However, initially these did not present serious problems, since Japanese investment in East Asia concentrated on lower-end consumer electronics (such as television sets and household appliances) and related standardized components that do not require close interaction with customers yet allow significant benefits from scale economies. Investments of United States TNCs, by contrast, have concentrated on integrated circuits and products related to personal computers (PCs) that are highly differentiated and thus require close interaction with customers. However, following the liberalization of the Japanese computer market and the shift by many Japanese companies from mainframe to PC-based systems in the early 1990s, Japanese affiliates in East Asia have increasingly moved towards producing PC-related products as well.

Until recently, affiliates of Japanese TNCs were less inclined to establish backward linkages with domestic firms in the host countries than affiliates of United States TNCs.

Until recently, affiliates of Japanese TNCs were less inclined to establish backward linkages with domestic firms in the host countries than affiliates of United States TNCs, tending to rely more on imports of components and materials from Japan. This was partly because of their more hierarchical and centralized management structure. Japanese FDI in the export-oriented electronics sector also started much later than FDI from the United States. Since it takes time to establish relationships with local suppliers who can meet international standards in price, quality, design and delivery, Japanese affiliates tended to procure components from secure and reliable suppliers in Japan. The Japanese suppliers were also able to provide components conforming to specialized in-house designs that were preferred over the local suppliers' standard designs. However, since the early 1990s, as a result of growing price competition from United States companies in electronic data processing equipment, Japanese producers increased their purchases of end-products in East Asia and shifted part of their production to that region (Ernst and Guerrieri, 1998: 201).

Differences in the motives for investment abroad have also resulted in different practices. While United States TNCs have traditionally sought lower-cost production sites, the motive of Japanese investors has often been to jump trade barriers against Japanese exports, such as voluntary export restraints (VERs) or anti-dumping practices. One consequence of this has been the development of a triangular trade pattern, whereby Japanese affiliates source components from Japan and export the final products directly from their offshore sites to third markets.

The traditional intra-firm pattern continues to govern the activities of Japanese TNCs in consumer electronics and appliances, but there are indications that Japanese affiliates involved in computer-related products are increasingly moving towards more local sourcing of components and materials, and are becoming more embedded in the host economies. One reason is the development of local production capabilities in host countries. Another is the increasing need to use cheaper mass-produced components as a result of tougher competition, and the growing importance of speed-to-market (i.e. getting the right product to the most buoyant markets on time), for which the traditional Japanese management system was ill-equipped.

These developments have resulted in the emergence of a pattern of regional specialization in East Asia that encompasses both parent-affiliate and inter-firm supplier networks. Of these, the latter is becoming more important, as firms increasingly focus on core competencies and purchase intermediate goods and services from other firms. Although details differ for different product groups, both United States and Japanese firms have concentrated on the same types of activities in the same economies: Hong Kong

(China) and Singapore compete for regional headquarters; the Republic of Korea and Taiwan Province of China compete for original equipment manufacturer contracts and as suppliers of precision instruments; Malaysia, the Philippines and Thailand compete as locations for mid-level and some higher-tech products that involve scale economies; and China and Indonesia (and, to some extent, Viet Nam) compete for low-end and simple component manufacturing.[2]

The evolution of the electronics industry in East Asia differs across countries. The experience of the Republic of Korea is of particular interest because of its success in becoming the second largest supplier, behind Japan, for a broad range of consumer electronics (audio equipment, television sets, video recorders and microwave ovens), and an increasingly significant supplier of high-precision components and industrial electronics. Despite this, the evolution of the electronics industry in the Republic of Korea has been described as "truncated industrial upgrading" in the sense that its firms have failed to upgrade certain features necessary for long-term growth and sustained industrial upgrading (Ernst, 1998). Its electronics sector consists of a few large firms that pursue a strategy of massive investment in integrated production systems; they rely on a high degree of vertical and horizontal integration, and focus on quantitative targets in capacity expansion and international market share for relatively homogeneous products such as consumer electronics and computer memories. This strategy has resulted in the development of operational capabilities in production and investment; but there is a high degree of dependence on imports of equipment and materials, and there has been little progress in knowledge upgrading in product design, market development and the provision of high-end knowledge-intensive support services.

The experience of the Republic of Korea shares certain features with the ASEAN countries and China in the way integration into international production networks has shaped the structure of their electronics sector. Specialization in standardized mass products with important scale economies tends to lead to a shallow involvement in a particular sector of the electronics industry and increases the import dependence of production. Moreover, it provides little impulse for broadening the knowledge base of the labour force. However, the Korean experience differs significantly from the more recent involvement of the ASEAN countries and China in international production sharing in electronics. With Japanese firms shifting from consumer electronics and appliances to PC-related products alongside the United States TNCs, a new pattern of regional production sharing has emerged, giving rise to overlapping and competing international production networks. This development has broadened the options available to the East Asian economies, allowing them to supply buyers in different production networks in an effort to amortize their substantial investment outlays and gain economies of scale as quickly as possible. However, it also implies that buyers have a wider choice of suppliers and will seek the best offer, in particular with respect to low-end and large-volume products. The fact that production costs of such products often depend on the length of production runs, creates a risk of overproduction and intense price competition. This risk has become particularly acute with the recent decline in world demand for products such as semiconductors.

Specialization in standardized mass products with important scale economies tends to lead to a shallow involvement in a particular sector of the electronics industry and increases the import dependence of production.

Widening production networks in electronics have also made a significant impact on bilateral trade flows in these products. Figures on trade in parts of computers and office machines show a rapidly growing one-way trade from the first-tier NIEs and ASEAN-4 to the United States and the EU-8 (table 3.A4). This has been accompanied by a decline in Japanese exports to these destinations, and a sizeable increase in two-way bilateral trade between Japan and the first-tier NIEs and the ASEAN-4, as well as between the first-tier NIEs and the ASEAN-4. More recently, China has also become part of this pattern. These results suggest

Table 3.A4

BILATERAL TRADE IN PARTS OF COMPUTERS AND OFFICE MACHINES BETWEEN SELECTED TRADING PARTNERS, 1980–1998

(Percentage shares in total world exports)

	1980	1985	1990	1995	1998
Exports of first-tier NIEs to:					
ASEAN-4	0.1	0.4	1.4	2.1	2.0
China	0.1	0.6	0.3	0.6	0.8
Japan	0.4	0.5	0.6	1.3	1.3
EU-8	0.4	1.0	2.6	3.8	4.5
United States	4.2	4.2	4.8	7.7	5.6
Imports of first-tier NIEs from:					
ASEAN-4	0.0	0.1	2.0	3.2	3.9
China	0.0	0.0	0.2	0.9	1.2
Japan	0.8	1.0	1.7	2.9	2.0
EU-8	0.4	0.3	0.4	0.5	0.5
United States	3.4	3.8	2.2	2.1	1.8
Exports of ASEAN-4 to:					
China	0.0	0.0	0.0	0.0	0.6
Japan	0.0	0.0	0.3	0.8	1.2
EU-8	0.0	0.0	0.3	1.0	2.1
United States	0.0	0.2	0.9	2.1	3.4
Imports of ASEAN-4 from:					
China	0.0	0.0	0.0	0.0	0.2
Japan	0.1	0.1	0.5	1.0	1.2
EU-8	0.1	0.1	0.1	0.1	0.1
United States	0.1	0.3	0.3	0.7	0.6
Exports of China to:					
Japan	0.0	0.0	0.0	0.2	0.4
EU-8	0.0	0.0	0.0	0.3	0.4
United States	0.0	0.0	0.0	0.4	0.7
Imports of China from:					
Japan	0.0	0.1	0.0	0.6	0.6
EU-8	0.1	0.0	0.0	0.0	0.0
United States	0.1	0.2	0.0	0.1	0.3
Exports of EU-8 to:					
Japan	0.7	0.2	0.3	0.6	0.2
Eastern Europe	0.5	0.1	0.2	0.5	1.0
EU-8	25.7	22.9	20.5	11.7	10.0
Imports of EU-8 from:					
Japan	1.5	2.4	4.8	4.5	3.2
Eastern Europe	0.0	0.0	0.0	0.1	0.8
Exports of United States to:					
Japan	2.9	3.0	3.0	1.9	1.6
Mexico	1.7	1.6	0.9	0.8	1.3
Imports of United States from:					
Japan	2.5	5.5	9.8	8.0	5.4
Mexico	0.0	1.1	0.2	0.7	1.7

Source: See table 3.A3.

Note: Data in this table relates to SITC 759. The composition of the regional/subregional groups is as in table 3.A3.

that the relocation of production from Japan to the East Asian developing countries and the creation of international production sharing among the latter have been important factors in the rapid expansion of trade in electronics products. A similar pattern of two-way bilateral trade has also evolved since the mid-1990s between the EU-8 and Eastern Europe, as well as between the United States and Mexico.

3. The effects of preferential trading arrangements: the automotive sector

Automobile production is one of the most important industrial activities in the world, and one of the fastest growing sectors in world trade. It has also played a critical role in the industrialization of many countries, including some of the larger developing countries, where its expansion has often been closely associated with an import substitution strategy. However, many developing countries have failed to establish competitive national automobile firms, in large part because the size of their domestic markets has not allowed exploitation of important scale economies that characterize this sector.

One way of overcoming this problem has been to create a regionally integrated automobile industry, supported by a preferential trade arrangement to protect it against competition from mature industries in developed economies. Indeed, one of the first consequences of regional integration in the Southern Common Market (MERCOSUR) and in the ASEAN Free Trade Area (AFTA) was the creation of regional production networks in the automobile industry and the dispersion of its manufacturing processes across national frontiers.[3] By contrast, the creation of the North American Free Trade Area in 1993, as a formal regional economic arrangement between developed and developing countries, marked the culmination of existing and increasingly close trade and investment ties in specific industries, notably the automotive sector in the United States and Mexico. The following section examines the impact of MERCOSUR and AFTA on the regional pattern of trade in greater detail. This is followed by a study of the impact of NAFTA on the development of the automobile industry in Mexico.

a. Production and trade patterns of MERCOSUR and AFTA

The evolution of the automotive sector in MERCOSUR and AFTA has been influenced not only by regional preferential trade agreements (PTAs), but also by increased activities of TNCs from the United States, Japan and the EU in these regions following their liberalization of FDI. In both regions, the removal of intraregional trade barriers increased the size of the market for firms established in the member countries, thereby allowing important scale economies. This factor, together with higher tariffs applied to imports from non-members, played an important role in attracting FDI, particularly in AFTA, where national automotive industries in Indonesia and Malaysia enjoyed a significant degree of protection against non-members. However, the pattern of integration has been somewhat different between the two regions. In AFTA, large differences in per capita

Table 3.A5

INTRAREGIONAL IMPORTS OF THE AUTOMOBILE INDUSTRY: MERCOSUR AND AFTA, 1980–1999

Region	$ million 1999	Share in total imports 1990	1995	1999	Growth rate (Per cent) 1980–1989	1990–1999	Memo item: Growth rate in extraregional imports 1980–1989	1990–1999
MERCOSUR								
Motor vehicles	2 027	41.0	19.5	52.7	15.5	40.2	-17.5	33.0
Parts of motor vehicles	694	22.6	41.8	25.1	8.9	20.8	10.4	19.0
AFTA								
Motor vehicles	175	1.1	1.0	5.4	9.4	18.6	1.5	-0.7
Parts of motor vehicles	195	1.1	2.9	9.5	17.3	20.8	14.2	-5.6
Memo item:								
WORLD								
Motor vehicles	365 672	.	.	.	10.7	6.6	.	.
Parts of motor vehicles	138 406	.	.	.	10.2	6.4	.	.

Source: See table 3.A3.
Note: Data in this table relates to SITC 781, 782, and 783 (motor vehicles), and to SITC 784 (parts of motor vehicles).

incomes and labour costs of the member countries have encouraged the creation of cross-border production networks within the automotive industry. By contrast, in MERCOSUR, where such differences are much smaller, investment has been driven by considerations of market size.

Intraregional trade in both automobiles and their parts and components has grown considerably in both regions, substantially exceeding their growth in world trade (table 3.A5). In MERCOSUR, imports from non-members grew substantially during the period 1990–1999, although somewhat less than imports from member countries. In AFTA, on the other hand, imports from non-members were lower in 1999 than they had been at the start of the decade, mainly as a result of the Asian financial crisis in 1997. Prior to the crisis, imports from non-members had grown fairly rapidly between 1990 and 1996 (at an average annual rate of 9.4 per cent for road vehicles and at 7.2 per cent for their parts and components, compared to growth rates in world imports of 4.5 per cent and 5.1 per cent respectively). However, on the whole, imports from non-members have been much lower in AFTA than in MERCOSUR, which reflects efforts to develop national industries in the Asian region.

Argentina and Brazil began developing automobile industries for their highly protected domestic markets in the 1950s. Since the early 1990s, the industry has undergone substantial restructuring as a result of special provisions in MERCOSUR designed to facilitate the expansion of activities of existing TNCs as well as to attract new ones. In addition, a bilateral agreement between Argentina and Brazil allows vehicles and parts to be imported duty-free, provided that the importer balances foreign purchases with exports (Romijn, Van Assouw and Mortimore, 2000: 130). These initiatives have led to the rationalization of investment and production, resulting in increased specialization and production complementarity

which involved the location of the small-scale production of larger vehicles in Argentina and the large-scale production of smaller vehicles for the mass market in Brazil. The initiatives have also boosted bilateral trade. In particular, they have provided an important stimulus to Argentina's automobile industry by significantly widening its market.[4] Unlike Argentina, scale economies are more important to the automobile industry in Brazil. For the latter country, however, regional integration has not generated much opportunity for the expansion of capacity needed to exploit scale economies. Consequently, Brazilian production has remained constrained, and low productivity associated with suboptimal production has limited exports to third markets.

National suppliers have lost importance in Brazil since 1990, when the market was opened to imports and assemblers moved increasingly towards global sourcing. Some of the transnational vehicle makers also established their own engine and component production sites; this led to the emergence of a more vertical supply structure whereby the surviving national suppliers were relegated from first- to second- or third-tier status. Argentina's auto parts industry has undergone a similar development: increased integration into international production networks has led most TNCs to concentrate design, engineering and R&D functions at headquarters, while their affiliates concentrate on manufacturing.

Indonesia, Malaysia, the Philippines and Thailand all began assembling automobiles in the late 1950s and early 1960s under relatively protective import-substitution regimes. While the industry in South America faced serious difficulties in the 1980s because of the debt crisis, in South-East Asia it entered a new phase of take-off after the mid-1980s as a result of rapid economic growth, the appreciation of the yen and the conclusion of regional trade agreements.[5] The impact of the appreciation of the yen on this industry in members of ASEAN was broadly the same as its impact on the electronics industry discussed above. Since Japanese TNCs wanted to use Japanese suppliers for their production networks, they persuaded their suppliers to establish plants in ASEAN countries (mainly Thailand). ASEAN governments adopted preferential agreements such as the ASEAN Industrial Cooperation Scheme (started in 1996), which granted some privileges – notably preferential tariffs to companies operating in an ASEAN member country and having a minimum of 30 per cent national equity – in order to help establish a more efficient regional division of labour and strengthen the competitiveness of the automobile industry (Romijn, Van Assouw and Mortimore, 2000: 139).

National suppliers have lost importance in Brazil since 1990, when the market was opened to imports and assemblers moved increasingly towards global sourcing.

b. NAFTA and the Mexican automotive industry

The take-off of the Mexican automobile industry preceded NAFTA, although the latter has given it a new momentum. The sector had been established in the 1960s in the context of import substituting industrialization, in which large foreign vehicle assemblers coexisted uneasily with smaller domestic component producers under tight government regulation and supervision. Despite high tariff barriers, the sector, which was heavily dependent on imported parts but had minimal export capacity, was a constant drain on foreign exchange. It thus became unviable after the debt crisis of the early 1980s. Some tentative steps towards greater export orientation were taken in the early 1980s. However, it was the combination of the debt crisis in Mexico and a concerted effort by United States auto manufacturers to defend profits and regain market share, in response to the successful penetration of North American markets by Japanese producers, that transformed the Mexican industry. Pressure to cut costs so as to compete with the Japanese producers made Mexico an attractive location for sourcing parts, and for vehicle assembly of certain models. A policy shift in Mexico towards more liberal trade and investment regimes led to a lowering of national content requirements for exported products (permitting 70 per cent of im-

ported components for exports compared to 40 per cent for sales in the domestic market). Along with specific incentives offered by both the United States and Mexican authorities to attract foreign producers into the automotive sector, this shift generated a burst of FDI in the Mexican automobile industry, beginning in the mid-1980s and accelerating in the first half of the 1990s (Romijn, Van Assouw and Mortimore, 2000).

Renewed TNC activity in Mexico led to the establishment of high productivity assembly plants exporting to the United States market – especially those producing automobile engines – in the first half of the 1980s. These plants, along with other auto-parts assemblers producing under the *maquiladora* programme, benefited from tariff exemptions granted by the United States under its Harmonized Tariff System 9802. Between 1979 and 1986, foreign firms established about 40 affiliates in northern Mexican border towns for assembling parts for re-export (Romijn, Van Assouw and Mortimore, 2000: 144). In the second half of the 1980s and early 1990s, both domestic sales and exports of passenger cars increased considerably. By 1994, exports accounted for well over half of all passenger cars produced. Moreover, there was a significant rise in the share of vehicles in total exports, from 10 per cent in 1985 to about 65 per cent by the early 1990s, when other foreign producers began to see Mexico as a potential platform from which to enter the United States market.

The early surge in FDI was accompanied by a steep rise in imports. The high level of imported parts from the United States meant that the sector experienced only small trade surpluses, and even deficits, until 1994. Nevertheless, the Mexican industry had undergone a fairly dramatic restructuring, both in terms of productivity levels and export orientation, by the time NAFTA came into effect. NAFTA further deepened this restructuring process, as it not only provided preferences that benefited United States TNCs in the automobile industry, but it also extended regional rules of origin to producers of non-American origin including component producers. In addition, the devaluation of the peso in connection with the financial crisis in 1994–1995 gave a sharp boost to exports when domestic sales collapsed. The prolonged United States boom in the second half of the 1990s firmly consolidated the position of Mexican producers as part of the regional industrial bloc. By the end of the decade, over two thirds of production was exported to the United States and trade surpluses had become the norm for the sector. Cross-border trade flows rose twelvefold between 1986 and 1999, compared with an average ninefold increase in total trade between the United States and Mexico, and a fivefold increase in Mexico's total trade. The surge in exports from the United States to Mexico during the second half of the 1990s was a strong indication of the rationalization of production by United States automobile manufacturers within an integrated North American production system.

Because the overall pattern has been driven by the needs of United States TNCs, weak linkages with domestic producers, low value added and a heavy reliance on a single market have given rise to concerns with regard to Mexico's own industrial development.

NAFTA thus appears to have consolidated a process of regional restructuring by leading United States producers who sought to defend their domestic market share. Both cost advantages and policy incentives led them to intensify production sharing with offshore assembly sites. A series of conjunctural macroeconomic factors also contributed to Mexico's export growth. However, because the overall pattern has been driven by the needs of United States TNCs, weak linkages with domestic producers, low value added and a heavy reliance on a single market have given rise to concerns with regard to Mexico's own industrial development. In particular, the Mexican components industry remains heavily concentrated in the labour-intensive processes of engine castings and wiring harnesses, although some upgrading is expected in the production of more complex parts such as transmissions (USITC, 1999a). Local content is particularly low among the *maquiladora* auto-parts assemblers, but even outside the border areas over two thirds of components are sourced outside Mexico (Romijn, Van Assouw and Mortimore, 2000).[6]

The surge in automobile exports after 1995 was helped by an undervalued currency and stagnant real wages that have kept real relative manufacturing labour costs low. Real wages in manufacturing in Mexico, which had been falling during the initial switch to a more export-oriented automotive sector in the second half of the 1980s, rose modestly prior to the currency crisis of 1994, but fell back to the level of the early 1980s for the remainder of the decade. Thus macroeconomic pressures, through exchange rate movements or wage trends, remain potential sources of vulnerability. ■

Notes

1 On the role of FDI in this context, see Mortimore, Lall and Romijn (2000); on outsourcing, see Graziani (2001) and Gereffi (1999).

2 See Ernst (1997). Anecdotal evidence on geographical relocation of specific operational units of TNCs suggests that China has recently succeeded in upgrading its involvement in international production sharing, performing activities that are technologically and managerially more demanding (see chapter V).

3 This contrasts with the traditional path of regional integration, which often involves the liberalization of trade in goods in the early stages, followed by liberalization of trade in services and of movements of labour and capital, and by increasing coordination of regulatory and other policies. A change in industry structure generally is not envisaged early in the process. For a general discussion of AFTA and MERCOSUR, see Athukorala and Menon (1997), and Preusse (2001); for a study of the automobile sector in the two regions, see Romijn, Van Assouw and Mortimore (2000).

4 This has also been helped by an agreement among industry, the Government and trade unions, called the "Argentine Automobile Regime", which carries an obligation to export a value approximately equal to the value of the imported components and finished vehicles (Miozzo, 2000).

5 In Malaysia this take-off was additionally supported by the launch of a "national car" project in 1983.

6 A new generation of *maquiladora* parts producers has emerged recently with the casting-off by Ford and General Motors of their in-house parts producers.