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SOUTH-SOUTH TRADE IN CAPITAL
GOODS. THE LATIN AMERICAN EXPE-
RIENCE

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South-south trade in capital goods. The
Latin American Experience

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1. Introduction

While most developing countries rely quite heavily on imports to meet their capital goods requirements, a few of them have made substantial progress in import substituting capital goods through the establishment of an indigenous engineering sector.

Of these few developing countries, three of them are in Latin America, i.e. Argentina, Brazil and Mexico. These countries, and especially Brazil, had not only reduced their import requirements of capital goods to the more technologically complex items. Brazil and Argentina have also been able to export an increasingly high portion of its production. Despite the progress made by Mexico in this sector, imports of machinery and transport equipment are still very significant and exports unimportant. Although other Latin American countries like Colombia, Venezuela and Peru have some indigenous production of capital goods and have been encouraging the development of a domestic engineering sector, their exports are still rather marginal.

The experience of the two leading Latin American exporters -accounting for eighty per cent of exports of capital goods by Latin America- which have moved from import substituting capital goods originated in the industrialized countries to some export expansion mostly to other developing countries provides a rich material for analysing the historical trends, the current features and the potential for further expansion of South South trade in this field.

An examination of the Latin American experience in capital goods exports may shed light on a number of issues related to South South trade that have been receiving increasing attention in the economic literature.

In a recent study on trade among developing countries sponsored by the World Bank a declining share of developing country markets in exports of manufactures by developing countries, except in the case of Latin American countries, was pointed out (Havrylyshin and Wolf, 1981). Furthermore while acknowledging the fact that trade among developing countries contains relatively more capital goods than trade with industrialized countries the World Bank sponsored study suggests that developing countries's exporters of capital goods are turning away from other developing countries's markets.

Although the time period and the classification of capital goods used in the present paper^{1/} differs somewhat from that used in the World Bank study, it is of interest to examine whether the suggested trends are valid for the Latin American exporters to be studied. Furthermore, the inclusion of the recessionary period of 1980s will add a new and significant dimension to assess the historical trends.

Besides assessing the trends regarding South oriented exports of capital goods by Latin American countries, an attempt will be made to shed light on the economic nature, benefits and potential for expanding South South trade in this field.

The advantages of South South trade have been questioned by authors like Krueger (1978) and Havrylishyn and Wolf (1981) on the basis of a neo Heckscher-Ohlin analytical framework. They estimated the factor content of South South *vis à vis* South-North trade and found that exports to the South are more capital intensive than exports to the North.

On the basis of these findings these authors have argued that not only South-South trade create less employment than South-North trade. They have also pointed out that the greater capital intensity of South-South trade was a result of the inefficient import substituting strategies followed by inward looking developing countries (e.g. the Latin American ones).

Amsden (1980) had precisely taken issue with this conventional view. She found that differences in capital-intensity of exports to the North and to the South were not statistically significant. At the same time, the skill intensive nature of South-South trade -which is particularly relevant for trade in capital goods- was emphasised in her findings and arguments.

Other authors like Katz (1977) and Lall (1983) have rightly criticised the conventional approach based on simplified models of comparative advantages. Katz pointed out that conventional models neglect the importance of technological learning and provided evidence on the process of adapting and improving technology imported originally for the North on the basis of minor innovations made by foreign and domestic firms with export activities. Lall (1983) focused in the dynamic elements of South-South trade and argued that exports to the South embody greater elements of local skills, technological capability and marketing abilities than exports to the North.

^{1/} Capital goods are defined unless otherwise stated as SITC 7 - (724 + 725 + 732), i.e. radio and TV sets and road motor vehicles are excluded. However, some ... are still included in the definition used which mainly reflect

In the light of these issues related to the factor and technological content and economic benefits of South South trade, the present paper attempts to provide fresh evidence on some of these questions focusing in a very important product in South South trade: capital goods. In so far as the focus is on capital goods, which generally are skill intensive commodities and in the experiences of Brazil and Argentina which have developed their engineering sector by import substitution but moved to a significant export expansion in the case of Brazil, the examination of the product composition and factor and technological content of capital goods exports will certainly provide new elements to understand the economic nature and likely benefits of South South trade.

The present paper introduces in an explicit way a crucial actor in South South trade that received hardly any attention in the conventional literature: exports generated by foreign controlled firms. The importance of such firms has been pointed out in the research carried out in the region since the pioneer study of Fajnzylber (1971). In the Argentine case most of the firms studied by Katz (1977) were precisely foreign controlled.

In this way, the issues discussed in the literature can be reinterpreted in the light of the different trade strategies followed by foreign and indigenous firms manufacturing capital goods in developing countries.

While a clarification of the economic nature and factor and technological content of capital goods exports by Latin American countries will certainly shed light on the potential for expanding South South trade in this type of goods, an attempt will be made to discuss another related issue: the importance of intra industry trade in capital goods.

As one of the key factors in the expansion of international trade in capital goods has been the importance of intra industry trade in which both large and small industrialized countries have been increasingly participating, it is important to learn to what extent a similar trend has taken place in the region. In this connection, Balassa (1979 a) found that intra industry specialization was greater than the average in non electrical and electrical machinery in six LAFTA countries in 1975. It is then worth examining the recent trends and the importance of intraindustry trade between Argentina and Brazil.

The paper is organized as follows. The main elements of the development of the indigenous capital goods sector and of the imports and exports of such goods in Brazil, Argentina and Mexico are provided in section 2. Section 3 is devoted to the discussion of the recent trends in capital goods trade in Latin America. The product composition and revealed comparative advantages of the capital goods items exported by Brazil and Argentina are analysed in section 4. The participation of foreign controlled and national firms in exports of capital goods by Brazil and Argentina is discussed in section 5. Section 6 is devoted to analyse the factor and technological content of capital goods exports to the South and to the North, in the light of participation of foreign and domestic firms. The importance of intraindustry trade in capital goods is analysed in section 7. In the light of the main findings of the paper the current economic situation and of some recent policy initiatives to promote Latin American trade in capital goods the policy implications of the subject are discussed in the concluding section.

2. The recent development of the capital goods sector and its export expansion in Brazil, Argentina and Mexico.

a) Overall trends

Brazil certainly has the most developed capital goods sector in Latin America and probably the leading one in the Third World (Chudnovsky and Nagao, 1983).

Although capital goods production has a long history in Brazilian industrial development, domestic production of capital goods gained momentum in the 1970s, especially since 1974 when several measures were introduced to foster local production of technologically complex capital goods and to reduce imports (Erber, 1982). As shown in Table 1, col. (5), domestic procurement of capital goods increased from 71 per cent in 1975 to 76 per cent in 1980 and to 84 per cent in 1982.

Imports of capital goods increased steeply in the first half of the 1970s and fluctuated afterwards. A sharp reduction is visible in 1982 due to the economic recession. The index of intraindustry trade in the Brazilian case was reduced from -0.75 in 1975 to -0.35 in 1980. The low figure for 1982 is due to the sharp reduction in imports (Table 1, col. (6)).

The production of capital goods grew at higher rates than total industry in the period of the boom and then, from 1977 onwards at lower rates. In 1982 the production was 15 per cent lower than in 1981 and idle capacity was very high (60 per cent for custom built capital goods) (Erber, 1984).

As part of a process of manufactured exports expansion and considerable geographical diversification, capital goods exports gained momentum in the 1970s. The participation of capital goods in the exports of manufactures increased from 27 per cent in 1975 to 33 per cent in 1980 (Table 4). The export ratio augmented from 5.5 per cent in 1975 to 13 per cent in 1980. The fall in exports experienced in 1982 also reduced the export ratio to 12 per cent in 1982 (Table 1).

Custom built capital goods ^{2/} augmented its share in total production of these goods from 17.5 per cent in 1975 to 22 per cent in 1982.

^{2/} Custom built production and trade figures are available on the basis of the information provided by the Brazilian Association for the Development of Heavy Industry (ABDIB).

Table 1
PRODUCTION AND TRADE IN CAPITAL GOODS
(in millions dollars)

Country	Year	Production a/	Exports b/	Imports b/	Apparent	(1) - (2)	(2) - (3)	(2)
		(1)	(2)	(3)	consumption	(4)	(2)+(3)	(1)
						(5)	(6)	(7)
						%		%
Argentina	1975	2 828	273	709	3 264	78	-0.44	9.7
	1980	6 393	379	2 871	8 885	68	-0.77	5.9
	1982	2 083	421	1 460	3 122	53	-0.55	20.2
Brazil	1975	9 909	546	3 823	13 186	71	-0.75	5.5
	1980	16 718	2 170	4 508	19 052	76	-0.35	13.0
	1982	17 815	2 120	3 304	18 699	84	-0.22	11.9
Mexico	1975	2 307	196	2 058	4 164	51	-0.82	8.6
	1980	5 200	268	5 904	10 836	46	-0.91	5.2
	1982	4 076	266	4 067	7 877	48	-0.88	6.5

Notes: a/ ISIC 38 - (381 + 3843)

b/ SITC 7 - (724 + 725 + 732)

Sources: Production: Brazil: ABDIB
Argentina: Central Bank
Mexico: NAFINSA-ONUUDI

Exports and Imports: UNCTAD: Data Bank.

Exports of custom built capital goods augmented 10 times in 1975-80 (from 53 to 529 millions dollars). After reaching a peak of 742 millions dollars in 1981, they were reduced to 696 millions in 1982.

The export ratio of custom built capital goods is much higher than for the industry as a whole. It augmented from 3 per cent in 1975 to 16 per cent in 1980 and to 18 per cent in 1982.

Argentina had a rather advanced metalworking sector that was able to supply most of the capital goods requirements of the country. As shown in Table 1, col. (5), 78 per cent of the apparent consumption of capital goods was locally supplied in 1975. Exports accounted for ten per cent of the value of production in that year.

The military government in office since 1976 until 1983 put into practice several policy instruments (a program of tariff reduction first and from late 1978 to early 1981 the overvaluation of the peso following the monetary approach to the balance of payments) that affected in a negative way the manufacturing industry. The metalworking industry was one of the most affected branches inside the manufacturing sector. The share of ISIC 38 in the manufacturing GDP was reduced from 26 per cent in 1974 to 21 per cent in 1982.

Although the production of the engineering industry augmented somewhat until 1979, a sensible reduction in the activity is visible since 1980. In this connection, the production figure for 1980 shown in Table 1 is very overstated due to the peso overvaluation. In constant prices, the production of ISIC 38 was only 4 per cent higher in 1980 than in 1975. The opening of the economy brought by the government policy is clearly manifested in the sharp increase in the intraindustry trade indicator from -0.44 in 1975 to -0.77 in 1980.

In 1982 the production of the metalworking industry was one third lower (in constant prices) than in 1975. The reduction in the production for the internal market and the moderate increase in exports led to a high export ratio in 1982: 20 per cent. However, capital goods reduced its share in exports of manufactures by Argentina from an exceptionally high 39 per cent in 1975 to 22 per cent in 1980. In 1982 capital goods accounted for 28 per cent of manufactured exports (Table 4).

In addition to the relatively good performance of exports -as compared with the production for the internal market- it is noteworthy in the Argentine case that some segments of the engineering industry were preserved during the military

Table 2
CAPITAL GOODS ^{a/} EXPORTS FROM DEVELOPING AMERICA, ARGENTINA, BRAZIL AND MEXICO
(millions of dollars)

Origin	DISTRIBUTION		WORLD		NORTH ^{b/}		SOUTH ^{c/}		Africa and Asia		Total	
	Year	Value	Value	%	Value	%	Value	%	Value	%	Value	%
Developing America	1970	286	135	47.2	144	50.3	6	2.1	150	52.4	741	64.4
	1975	1 151	409	35.5	692	60.1	49	4.3	1 912	59.4	1 912	59.4
	1980 ^{d/}	3 217	1 296	40.3	1 576	49.0	336	10.4	1 559	49.9	1 559	49.9
	1982 ^{d/e/}	3 124	1 558	49.9	1 054	33.7	505	16.2				
Argentina	1970	54	15	27.8	38	70.4	1	1.9	39	72.3	226	82.8
	1975	273	48	17.6	220	80.6	6	2.2	286	75.5	286	75.5
	1980	379	92	24.3	260	68.6	26	6.9	194	46.1	194	46.1
	1982	421	227	53.9	176	41.8	18	4.3				
Brazil	1970	81	23	28.4	55	67.9	2	2.5	57	70.4	334	61.1
	1975	546	212	38.8	300	54.9	34	6.2	1 326	61.0	1 326	61.0
	1980	2 174	841	38.7	1 039	47.8	287	13.2	1 184	55.9	1 184	55.9
	1982	2 120	931	43.9	699	33.0	485	22.9				
Mexico	1970	87	64	73.6	23	26.4			23	26.4	91	46.4
	1975	196	105	53.6	82	41.8	9	4.6	51	19.0	51	19.0
	1980 ^{d/}	268	217	81.0	51	19.0	N.A.	N.A.	26	9.8	26	9.8
	1982 ^{d/}	266	240	90.2			N.A.	N.A.				

Notes: ^{a/} SITC 7-(724 + 725 + 732)

^{b/} North means Developed Market Economy Countries.

^{c/} South means Developing Countries

^{d/} Mexican data on total exports as stated in NAFINSA-ONUDI (1984) with the geographical distribution shown in INTAL (1984) were added. Mexican exports to north include all other destinations except Latin America.

^{e/} Venezuelan and Chilean exports as stated in INTAL (1984) were included. Capital goods for these two countries include domestic appliances and exclude tractors. Exports from these two countries to the north include all other destinations except Latin America.

Source: Own elaboration on the basis of figures from UNCTAD data bank.

Table 3
CAPITAL GOODS ^{a/} IMPORTS BY DEVELOPING AMERICA, ARGENTINA, BRAZIL AND MEXICO
(millions of dollars)

Destination	ORIGIN Year	WORLD		NORTH ^{b/}		SOUTH ^{c/}		Africa and Asia		Total	
		Value	%	Value	%	Value	%	Value	%	Value	%
Developing America	1975	11 873	100	11 021	92.8	587	4.9	49	0.4	636	5.4
	1980 ^{d/}	22 427	100	20 727	92.4	1 331	5.9	136	0.6	1 467	6.5
	1982 ^{d/e/}	17 660	100	16 534	93.6	851	4.8	94	0.5	945	5.4
Argentina	1975	709	100	614	86.6	61	8.6	2	0.3	63	8.9
	1980	2 871	100	2 548	88.7	251	8.7	25	0.9	276	9.6
	1982	1 460	100	1 314	90.0	98	6.7	7	0.5	105	7.2
Brazil	1975	3 823	100	3 667	95.9	88	2.3	6	0.2	94	2.5
	1980	4 508	100	4 316	95.7	100	2.2	23	0.5	123	2.7
	1982	3 304	100	3 171	96.0	45	2.0	28	0.8	73	2.2
Mexico	1975	2 058	100	1 925	93.5	56	2.7	3	0.1	59	2.9
	1980 ^{d/}	5 904	100	5 615	95.1	289	4.9	N.A.	N.A.	289	4.9
	1982 ^{d/}	4 067	100	3 961	97.4	106	2.6	N.A.	N.A.	106	2.6
Venezuela	1975	1 883	100	1 783	94.7	85	4.5	7	0.4	92	4.9
	1980	3 025	100	2 879	95.2	119	3.9	14	0.5	133	4.4
	1982 ^{e/}	3 487	100	3 316	95.1	171	4.9	N.A.	N.A.	171	4.9
Colombia	1975	370	100	343	92.7	21	5.7	2	0.5	23	6.2
	1980	406	100	988	89.3	85	7.7	10	0.9	95	8.6
	1982	1 377	100	1 227	89.1	120	8.7	9	0.7	129	9.4

Notes: As for table 2.

Source: As for table 2.

Table 4
PARTICIPATION OF CAPITAL GOODS ^{a/} IN EXPORTS IN MANUFACTURES ^{f/}

(%)

	Year	WORLD	SAUTH c/		Total
			NORTH b/	Developing America Non-Developing America	
Developing America	1975	20.6	15.2	27.0	20.8
	1980 ^{d/}	21.0	18.6	23.1	26.4
	1982 ^{d/e/}	21.1	20.5	19.2	36.1
Argentina	1975	39.0	24.9	46.6	66.7
	1980	22.1	12.0	33.0	59.1
	1982	27.8	28.0	30.9	40.0
Brazil	1975	27.0	20.2	38.8	20.4
	1980	32.9	29.2	38.6	31.0
	1982	31.5	26.8	33.7	45.9
Mexico	1975	22.2	19.5	26.4	30.0
	1980 ^{d/}	14.3	15.5	10.6	N.A
	1982 ^{d/}	15.0	17.1	6.9	N.A

Notes: a) to e) as for table 2.

f) SITC 5 to 8 less (67 + 68)

Source: As for table 2.

government (i.e. those linked to the nuclear plan, to oil exploration and to some extent to hydroelectric works besides the civilian subcontractors of the armaments industry) and others have started to recuperate since 1981 when the policy of peso overvaluation was terminated (e.g. agricultural machinery).

In the Mexican case, despite the efforts made by the government to foster the indigenous production of capital goods and the actual growth of such production in the 1970s ^{3/}, the tremendous rise in the demand of capital goods during the oil boom, led to a significant rise in capital goods imports.

The trade deficit experienced by Mexico in this sector is clearly manifested in the high negative indicators of intraindustry trade shown in Table 1. Domestically produced capital goods accounted for less than half of the apparent consumption of these goods.

From the 45 significant projects to foster the development of an indigenous capital goods initiated since 1974 only six are in operation and twelve were completed but not yet in production (NAFINSA/ONUUDI, 1984). It is for these reasons that despite the importance of the economy and its manufacturing sector, capital goods remains relatively underdeveloped in the Mexican economy.

Regarding exports of capital goods, they are not very significant in total exports of manufactures. They accounted for 22 per cent of exports of manufactures in 1975 and the share was reduced to 15 per cent in 1982 (Table 4). Export ratios decreased from 8.6 per cent in 1975 to 5.2 per cent in 1980 and increased slightly to 6.5 per cent in 1982 (Table 1).

b) Incentives for exports

While in the Argentine case, incentives did not play any particular role in promoting exports (except in the shipbuilding industry), any analysis of the Brazilian export expansion has to take into account the important role played by fiscal and financial incentives to promote exports of manufactures. The most sophisticated instrument of incentives is called Befiex (fiscal benefits to special export programs). In return for a commitment to reach export targets for about

^{3/} In constant prices the production of capital goods augmented 50 per cent between 1975 and 1980. The figure for 1980 shown in Table 1 is overstated by the peso overvaluation.

ten years the following incentives are normally given: 70-90 per cent duty and tax reduction on imports of capital goods; 50 per cent reduction on imports of raw materials and intermediate products and in some cases complete exceptions on import duties; waiver of the "law of similars"; guarantees against changes in incentive systems; income tax reductions and some-strait subsidy (credito-premio). About 18-20 per cent of manufactured exports entered into the Befiex program in 1978-80. Half of the agreed exports in 1980 were carried out by the automotive companies and 10 per cent by machinery producers. In addition to Befiex, other fiscal and financial incentives are used (for details see Peñalver et al 1983).

Although the automotive industry has been specially favoured by the incentives system, exporters of electrical and non electrical machinery have been also among the chief beneficiaries of the system. In 1980, while the average rate of fiscal incentives for manufactured exports was 12.7 per cent, the rate in question was 54.5 per cent for transport equipment, 27.7 per cent for electrical material and 15.9 per cent for non electrical machinery (Peñalver et al 1983, Table 6.7).

In addition to the fiscal incentives, a system of financial incentives for exports is in operation. Of special importance for capital goods exports, is the Finex program. This program provides working capital during the production period of the item to be exported (minimum of 18 months) and the normal post delivery credit to both supplier and acquirer.

Finally, the exchange rate policy and the wage policy applied by Brazil in the 1980s have been clearly shaped to promote exports of manufactures, compensating somewhat the significant reduction experienced in the domestic economic activity.

3. Main trends in Latin American trade in capital goods

a) Overall trends

Exports of capital goods from Latin America to the world grew very quickly in the 1970s (especially in the first half of the decade) and declined in the 1980s. This decline is due to the dramatic reduction in intraregional exports (one third lower in 1982 than in 1980). In contrast, exports to developing Asia and Africa and to the North continued growing, though at a lower rate, in 1980-82 (Table 2).

Developing countries have been the main destination of Latin American exports of capital goods. Such countries augmented their participation as destination market from 52 per cent in 1970 to almost two thirds in 1975. A decline is visible afterwards, especially in the 1980s. The share of developing countries in Latin American exports of capital goods was slightly lower in 1982 than in 1970.

A declining share of Latin America as main destination region within developing countries is apparent since the mid 1970s. Although exports of capital goods to developing Asia and Africa grew dramatically, they did not compensate for the declining share of Latin America, clearly aggravated by the economic situation of the region in the 1980s.^{4/}

A better picture of intra Latin American trade in capital goods can be drawn when imports are examined. As shown in Table 3, Latin American imports of capital goods decreased from 22 billions dollars in 1980 to 17.7 billions dollars in 1982. The share of intra Latin American imports fell from 5.9 per cent in 1980 to 4.8 per cent in 1982. In this way capital goods originated in the region were relatively more affected by the reduction in total imports than those coming from the North (whose share in total imports by Latin America augmented from 92.4 per cent in 1980 to 93.6 per cent in 1982).

It is worth nothing that capital goods exported from Latin American countries

^{4/} In this way, the picture given by the World Bank study has to be modified somewhat. A decline in the importance of developing countries markets in Latin American exports of capital goods is already visible since 1975 but it is noteworthy only in the recessionary years of the 1980s.

had a lower than the average participation in the three largest importing countries of the region, i.e. Mexico, Venezuela and Brazil. Only Argentina and Colombia among the largest importers relied on Latin American sources more than the average for their capital goods requirements. This is also the case for the smaller countries of the region not listed in Table 3. For those countries Latin American sources accounted for 8.5 per cent of total imports of capital goods in 1980 (and 7.7 per cent in 1982).

Capital goods accounted for one third of the imports of manufactures by Latin America and for 21 per cent of the exports of such goods. They increased their participation in the Latin American manufactured exports to developing Asia and Africa (from 20.8 per cent in 1975 to 36.1 per cent in 1982) and reduced their importance in intra regional trade. At the same time, capital goods in creased their share in exports of manufactures to the North (Table 4).

b) Brazilian, Argentine and Mexican exports

Exports of capital goods from Latin America are highly concentrated. Brazil alone accounted for 68 per cent of total exports. With Argentina and Mexico, the three leading countries accounted for 90 per cent of the region's exports of these goods.

Developing countries as main destination market for Brazilian exports of capital goods declined their participation from 70 per cent in 1970 to 61 per cent in 1975 and 1980 and 56 per cent in 1982 ^{5/}. This is mostly due to the sharp reduction in the importance of Latin America as importing market. Developing Asia and Africa increased their participation in Brazilian exports of capital goods and accounted for 23 per cent of such exports in 1982.

In the case of custom order capital goods, the South accounted for seventy one per cent of total exports in 1981-82. However, a growing importance of developing Africa and Asia is visible as compared with Latin America as destination markets ^{6/}

In the Brazilian case, capital goods accounted for 27 per cent of exports of

^{5/} If a shorter time period is taken and three years average are used the decline is less significant. As shown below in Table 6 the South accounted for 59 per cent of total exports of Brazilian capital goods in 1980-82 and for 61 per cent in 1975-75.

^{6/} According to Sercovich (1983) Latin America accounted for 54 per cent and developing Africa and Asia for 16 per cent of custom order capital goods (excluding transport equipment) in 1976-81.

manufactures to the North and for 46 per cent of such exports to developing Asia and Africa in 1982, while they have reduced their participation in exports to Latin America.

Developing countries accounted for more than 80 per cent of Argentine exports of capital goods in 1975, and for only 46 per cent in 1982. This is mainly due to the fall in exports to Latin America that was not compensated, like in the case of Brazil, by growing exports to developing Africa and Asia.

The increasing importance of Argentine exports of capital goods to the North (in both absolute and relative terms) is in any case a recent trend worth taking into account. As shown below, this is mostly due to the growth of intrafirm trade and exports of ships and boats.

The participation of capital goods in manufactured exports by Argentina to the North and to developing America was rather similar, being higher in exports to non developing America (Table 4).

In sharp contrast to the other countries analysed above, Mexican exports of capital goods were largely oriented to the North, with the exception of 1975. It is for the reason that Mexican exports of capital goods are not going to be discussed in the present paper.

c) Intra Latin American trade

Although Latin America has reduced its weight as destination market for Brazilian and Argentine exports of capital goods, it is interesting to have an idea of the country composition of intraregional trade in capital goods (Table 5).

While in the case of Brazil, the importance of neighbour countries in exports to Latin America slightly decreased and was 28 per cent in 1982, this is not the case with Argentina. Neighbour countries accounted for 56 per cent of exports to Latin America in 1982 (from 36 per cent in 1975).

Argentina and Mexico declined their importance as destination markets for Brazilian exports of capital goods. The same trend is visible regarding Argentine exports to Brazil and Mexico. The Andean Pact was the leading destination for Brazilian exports of capital goods and other small Latin American countries augmented sharply their importance.

Cuba was a very important market for Argentine exports of capital goods in 1975, but a sharp reduction is visible afterwards. The Andean Pact became an important market as well for Argentine exports of capital goods.

Table 5

INTRA LATIN AMERICA TRADE IN CAPITAL GOODS

Destination	Origin	Argentina		Brazil	
		1975	1982	1975	1982
Exports to Developing America (millions of dollars)		219.5	176.3	299.5	699.4
<u>Percentage</u>					
Neighbours <u>a/</u>		35.6	56.4	30.7	27.8
Andean Pact <u>b/</u>		15.7	20.9	31.7	32.0
Mexico		7.1	5.2	17.4	13.7
Cuba		21.5	1.5	-	-
Argentina		-	-	13.8	8.1
Brazil		19.5	14.1	-	-
Others <u>c/</u>		0.7	1.9	6.2	18.4

Notes: a/ Paraguay, Bolivia, Chile and Uruguay

b/ Excluded Bolivia

c/ Other Latin American Countries

Source: As in table 2.

4. Product characteristics of capital goods exportsa) Commodity composition

To be able to shed light on the commodity composition of capital goods exported from Latin America to developing countries and to compare such composition with that of exports to developed market economy countries, capital goods exports from Argentina and Brazil at four digits level were analysed.

Exports for 1973-75 and for 1980-82 were calculated to be able to have information for the more normal years of the 1970s and for the recession years of the 1980s. Averages were used to iron out fluctuations. The percentage of exports of each product going to the North and to the South for both periods were also calculated (Tables 6 and 7).

Products are divided in custom built and series built, according to whether the items considered as custom made by the Brazilian Association for the Development of Heavy Industry (ABDIB) are predominant or not in the goods classified at four digits in the SITC.

Although this is not a very accurate classification, an idea can be gained on the technological requirements of each type of product. Custom built capital goods are made in small batches and design requirements are generally higher than in series built capital goods. Although the basic design work is normally imported from suppliers based in industrialized countries, detailed design capacity has been developed in a considerable way in countries like Brazil on the basis of indigenous skills. Fabrication technology of this kind of goods has also been mastered by Brazilian firms (Erber, 1982).

Series built capital goods is a large category covering many items fabricated in small and medium batches and a few ones produced in large series where economies of scale are important (e.g. piston engines). Design requirements can also be high in some series built capital goods but are generally lower than in custom made equipment. This is mostly due to the fact that many series built capital goods are relatively standard and hence design requirements are not demanding. However, the possibilities of adapting and improving imported product and process engineering certainly exist.

Table 6

BRAZIL: PRODUCT COMPOSITION OF CAPITAL GOODS EXPORTS

	EXPORTS (millions of dollars)		EXPORTS (%)		EXPORTS to		Revealed Comparative Advantage to		Foreign firm's		
	Average 1973-1975	Average 1980-1982	North Av. 1973-75	South Av. 1973-75	North Av. 1930-82	South Av. 1930-82	Average 1973-75	Average 1980-82	Average 1973-75	Average 1980-82	
ALL CAPITAL GOODS:	373.4	2 253.8	39.2	60.8	40.9	59.1	0.51	0.92	0.77	0.83	64.9 £/ \$
- Non electrical machinery	280.0	1 546.0	39.2	60.8	41.3	58.7	0.60	1.02	1.05	1.03	76.1
- Electrical machinery	71.7	316.0	45.1	54.9	45.1	54.9	0.53	0.61	0.74	0.73	N.A.
- Transport equipment	21.7	391.8	20.0	80.0	36.1	63.9	0.10	0.98	0.23	0.80	N.A.
Mostly Custom-built	25.3	331.8									
- North oriented d/	0.8	21.5	12.5	87.5	54.0	46.0	0.12	3.55	0.44	1.26	N.A.
7317 Ry Locomotive, car parts nes	0.8	21.5									
- South oriented e/	24.5	310.3		100.0		76.4		0.67	0.57	0.27	69.7
7111 Steam boiler	1.0	5.5	15.0	85.0	20.0	80.0	0.04	0.14	0.09	0.12	69.7
7112 Boiler houses plant nes	0.1	0.5	0.9	99.1	3.1	96.9		0.03	0.20	0.04	39.9
7113 Steam engines, turbines	0.2	0.4	20.8	79.2	21.7	78.2	1.05	1.68	8.70	7.29	59.6
7194 Domestic appl. nonelectric	2.4	9.2	14.9	85.1	20.0	80.0	0.18	0.41	0.76	0.62	24.3 b/
7221 Electric power mach.	10.1	49.4				100.0				1.50	N.A.
7221 Electric power mach.		0.5			2.3	97.7		0.73		2.97	N.A.
7312 Ry Locomotives electric		17.2		100.0	25.8	74.2	0.0009	1.20	3.42	3.98	N.A.
7313 Locom. not steam, not elec.	2.8	18.2			29.4	70.6		1.94	0.15	1.97	N.A.
7316 Freight cars, not powered		2.5			29.4	70.6		1.94	0.15	1.97	28.5
7351 Warships of all kinds	7.9	140.7	13.9	86.1	32.0	68.0		3.00		1.79	28.5
7353 Ships and boats non war		66.2									
7359 Ships and boats nes											
Mostly Series-built	332.6	1 838.1									
- North oriented d/	142.4	807.2									
7114 Aircraft engines inc. jet	11.8	6.0	80.5	19.5	61.7	38.3	1.37	0.18	0.88	0.18	100.0
7115 Piston engines non air	42.2	347.3	72.7	27.3	82.9	17.1	2.01	5.50	0.98	0.88	89.0
7116 Gas turbines non-aircraft		0.3									
7143 Statistical machines	37.4	176.2	75.1	24.9	65.7	34.3	3.42	1.94	5.13	2.82	99.4
7149 Office machines nes	13.9	29.9	87.8	12.2	81.3	18.7	1.11	0.56	0.53	0.30	97.1
7293 Transistors, valves, etc.	14.6	59.1	63.0	37.0	80.5	19.5	1.10	1.17	0.68	0.15	N.A.
7294 Automotive elect. equip.	14.2	51.1	81.7	18.3	72.4	27.6	3.86	3.62	1.35	1.29	N.A.
7295 Elec-measuring control equip.	1.4	27.4	21.4	78.6	66.1	33.9	0.05	0.49	0.30	0.28	96.3
7341 Aircraft heavier than air	6.0	96.1	21.4	72.2	70.9	29.1	0.20	2.42	0.38	1.09	6.1

	EXPORTS (millions of dollars)		EXPORTS (%)		EXPORTS to		Revealed Comparative Advantage to		Foreign firm's		
	Average 1973-1975	Average 1980-1982	North Av. 1973-75	South Av. 1973-75	North Av. 1930-82	South Av. 1930-82	Average 1973-75	Average 1980-82	Average 1973-75	Average 1980-82	
7349 Aircraft parts, etc.	0.9	13.8	55.6	44.4	53.6	46.4	0.07	0.26	0.06	0.21	0.0
- South oriented e/	190.2	1 030.9									
7121 Cultivating machinery	3.7	15.1	5.4	94.6	7.9	92.1	0.18	0.27	0.76	3.56	16.2
7122 Harvesting, etc. machines	4.6	19.1	4.3	95.7	1.0	99.0	0.03	0.01	2.68	2.40	54.3
7123 Dairy farm equipment	0.03	0.6	21.2	78.8	33.3	66.7	0.02	1.14	0.16	0.32	46.3
7125 Tractors non road	12.7	158.4	1.6	98.4	20.8	79.2	0.03	1.67	1.52	3.85	N.A.
7129 Agriculture machines nes	0.5	2.5	6.0	94.0	20.0	80.0	0.91	0.27	0.04	0.57	30.8
7141 Type-writers cheque-writs	21.2	59.0	6.1	93.9	27.5	72.5	0.71	2.56	20.70	11.33	95.3
7142 Adding machines, computers	10.4	55.6	5.3	94.7	42.8	57.2	0.84	0.96	3.34	2.05	94.3
7151 Machine tools for metal	9.5	55.6	1.8	98.2	10.3	89.7	0.06	0.50	1.41	1.43	43.8
7152 Metalworking machinery nes	0.6	9.7	44.4	55.6	44.7	55.3	0.22	0.18	0.27	0.83	43.8
7171 Textile machinery	0.1	1.1	6.6	93.4	9.1	90.9	0.02	0.10	0.23	0.49	75.9
7172 Skin, leather working mach.	0.1	1.1	6.6	93.4	9.1	90.9	0.02	0.10	0.23	0.49	75.9
7173 Sewing machines	14.7	36.7	34.7	65.3	39.2	60.8	2.24	3.05	6.53	3.30	94.9
7183 Printing-binding mach.	0.4	2.6	10.0	90.0	3.2	96.8	0.01	0.06	0.15	0.22	27.9
7183 Food machry non domestic	3.8	12.4	1.3	98.7	3.2	96.8	0.03	0.06	1.66	0.92	69.4
7184 Const., mining machinery nes	17.1	27.4	4.8	94.2	11.0	89.0	0.10	0.29	0.98	0.75	78.3
7185 Crushing, etc., glass mach.	4.8	27.4	5.2	94.8	4.4	95.6	0.08	0.19	0.92	0.98	8.9
7191 Heating, cooling, equip.	6.3	85.6	7.9	92.1	2.0	98.0	0.06	0.07	0.51	1.13	28.6
7192 Pumps centrifuges	10.9	79.2	23.9	76.1	37.8	62.2	0.22	0.71	0.69	0.62	51.4
7195 Power tools nes	28.5	28.5	7.1	92.9	36.5	63.2	0.03	0.54	1.03	0.95	94.0
7196 Non-elect.machines nes	4.7	29.4	12.8	87.2	14.3	85.7	0.10	0.20	1.08	1.04	75.7
7197 Ball roller, etc. bearings	1.4	7.8	35.7	64.3	41.0	59.0	0.14	0.46	0.38	0.25	63.5
7198 Other mach. non electric.	7.2	45.6	9.7	90.3	11.8	88.2	0.07	0.18	0.64	0.87	63.5
7199 Machine parts access. nes	12.2	68.7	46.7	53.3	33.1	66.9	0.51	0.46	1.01	0.49	34.1 b/
7222 Switchgear, etc.	13.9	54.9	36.7	63.3	46.7	53.3	0.51	0.13	0.23	0.29	N.A.
7231 Insulated wire cable	0.5	11.7	1.3	98.7	5.3	94.7	0.01	0.23	0.80	1.45	86.5
7232 Electric insulated equip.	0.1	2.1	12.5	87.5	47.6	52.4	0.02	0.20	0.29	0.18	86.5
7262 X-Ray apparatus	2.0	11.2	3.4	96.6	33.3	66.7	0.0015	0.06	0.09	0.18	49.9
7291 Batteries, accumulators	2.0	11.9	3.0	97.0	5.0	95.0	0.04	0.09	1.32	0.99	N.A.
7292 Electric lamps bulbs	2.0	10.6	16.7	83.3	9.9	90.1	0.30	0.03	2.50	2.52	N.A.
7296 Electroch. hand tools	0.2	5.6	6.6	93.4	5.4	94.6	0.0075	0.05	0.33	1.81	N.A.
7299 Other electrical mach.	3.5	23.4	28.4	71.6	31.2	68.8	0.35	0.26	1.15	0.47	N.A.
7331 Bicycles non motor, parts	3.3	29.8	18.2	81.8	6.1	93.9	0.33	0.09	3.19	0.99	N.A.

	EXPORTS (millions of dollars)		EXPORTS to (\$)		Revealed Comparative Advantage to		Foreign firm's share in exports a/ 1982 (1)	
	Average 1973-1975		North South Av. 1973-75		NORTH SOUTH Average 1973-75			
	Average 1980-1982	Av. 1973-75	North Av. 1980-82	South Av. 1980-82	Average 1980-82	Average 1973-75		
333 Veh. nes non motor, trailers	1.5	20.0	2.5	97.5	0.10	0.07	1.31	58.3 b/
fixed c/	15.7	98.9						
South oriented e/	15.7	98.9						
118 Engines nes	1.0	2.2	1.1	98.9	0.02	0.01	0.58	56.4
181 Paper etc. mill machinery	4.2	28.6	71.4	10.6	89.4	0.40	1.23	75.4
193 Mechanical handling equip.	10.5	55.2	11.4	88.6	0.10	0.18	0.82	59.5

Notes: a/ Foreign firms were those listed in the Guia Interinvest (1983).

b/ Foreign firms' share in exports for 1980.

c/ Both custom built and series built products are included.

d/ North oriented means that 50% or more of the relevant exports were destined to the North in 1980-82.

e/ South oriented means that 50% or more of the relevant exports were destined to the South in 1980-82.

f/ Average for the listed products.

Source: Own elaboration on the basis of figures from UNCTAD data bank and CACEJ.

Table 7

ARGENTINA: PRODUCT COMPOSITION OF CAPITAL GOODS EXPORTS

	EXPORTS (millions of dollars)		EXPORTS to (\$)		Revealed Comparative Advantage to		Foreign firm's share in exports a/ 1983 (1)				
	Average 1973-1975		North South Av. 1973-75		NORTH SOUTH Average 1973-75						
	Average 1980-1982	Av. 1973-75	North Av. 1980-82	South Av. 1980-82	Average 1980-82	Average 1973-75					
ALL CAPITAL GOODS	216.7	387.4	18.3	81.7	39.6	60.4	0.55	0.64	0.90	0.77	59.01
Non electrical machinery	176.7	274.6	19.6	80.4	36.2	63.8	0.75	0.67	1.30	1.05	67.88
Electric machinery	24.2	44.4	17.4	82.6	16.2	83.8	0.27	0.13	0.56	0.52	69.83
Transport equipment	15.9	68.5	5.7	94.3	68.5	31.5	0.08	1.36	0.29	0.37	2.40
Mostly custom-built	17.8	83.2									
North oriented e/	4.5	71.6									
351 War ships of all kinds	-	0.3									
353 Ships and boats war	4.5	27.8	15.6	84.4	100.0	0.0	0.15	1.78	0.12	0.63	0.00
359 Ships and boat nes	0.04	43.5	-	100.0	99.8	0.2	-	2.76	0.01	0.01	0.00
South oriented d/	13.3	11.6									
111 Steam boilers	0.9	0.7	1.2	98.8	0.0	100.0	0.06	0.004	0.75	0.21	0.05
112 Boiler house	0.4	0.1	4.6	95.4	0.0	100.0	0.22	-	0.73	0.13	0.05
113 Steam engines, turbines	0.03	0.1	0.0	100.0	47.2	52.8	-	0.04	0.04	0.02	0.05
117 Nuclear reactors	0.002	0.4	-	100.0	-	-	-	-	0.01	0.84	0.00
194 Domestic appli non electric	1.8	0.1	66.7	33.3	10.9	89.1	10.21	0.04	3.90	0.52	0.00
221 Electric power machinery	5.5	5.8	9.1	90.9	12.1	87.9	0.66	0.13	0.25	0.39	18.22
314 Mechan-propelled by cars	0.1	0.1	2.5	97.5	-	100.0	0.07	-	0.42	0.31	N.A.
315 Passenger cars not powered	3.2	2.8	-	100.0	-	100.0	-	-	14.87	5.81	N.A.
316 Freight cars not powered	1.1	0.9	0.3	99.7	44.4	55.6	0.01	0.43	1.94	0.71	N.A.
317 Locomotive car parts nes	0.3	0.6	33.3	66.7	0.5	99.5	0.42	0.004	0.17	0.41	N.A.
Mostly series-built	191.2	323.0									
North oriented	23.3	104.8									
7114 Aircraft engines inc jet	0.01	0.4	100.0	0.0	95.9	4.1	0.01	0.07	-	0.01	0.00
7116 Gas Turbines non-aircraft	-	0.3	-	-	66.7	33.3	-	-	2.47	4.30	99.23
7143 Statistical machines	14.8	69.6	80.0	20.0	74.9	25.1	5.74	3.64	0.42	0.48	97.65
7149 Office machines nes	5.9	12.5	84.7	15.3	86.4	13.6	1.79	1.04	0.16	0.14	12.09
7171 Textile machinery	2.0	2.1	20.0	80.0	52.3	47.7	0.16	0.22	0.07	0.04	0.00
7173 Sewing machines	0.2	0.1	8.6	91.4	57.6	42.4	0.03	0.07	0.15	0.37	11.23
7197 Ball roller, etc. bearing	0.4	1.9	7.0	93.0	63.2	36.8	0.03	0.39	0.25	0.01	0.00

	EXPORTS (millions of dollars)		EXPORTS to North South		Revealed Comparative Advantage to North South		Revealed Comparative Advantage to South		Foreign firm's share in exports a/ 1983 (1)		
	Average 1973-1975	Average 1980-1982	Av. 1973-75		Av. 1980-82		Average 1973-75			Average 1980-82	
			North	South	North	South	Average 1973-75	Average 1980-82		Average 1973-75	Average 1980-82
7341 Aircraft heavier than air	0.01	17.4	100.0	0.0	99.8	0.2	0.004	2.57	0.01	0.00	
7349 Aircraft parts, etc.		0.5			100.0	0.0		0.07		0.00	
- South oriented	167.9	218.2									
7115 Piston engines non air	9.6	16.6	33.3	69.7	25.9	74.1	0.84	0.34	0.97	60.53	
7121 Cultivating machinery	2.5	4.0	3.1	96.9	0.1	99.9	0.20	0.005	5.51	11.97	
7122 Harvesting, etc. machines	9.4	3.9	0.5	99.5	0.2	99.8	0.04	0.002	2.60	0.00	
7125 Dairy farm equipment	0.9	0.1	5.7	94.3	3.2	94.8	0.55	0.92	0.47	0.00	
7125 Tractors non road	21.6	15.9	1.4	98.6	27.7	72.3	0.19	0.92	1.87	30.61	
7129 Agriculture machines nes	0.3	0.7	0.6	99.4	42.9	57.1	0.01	0.55	0.62	65.30	
7141 Type-writers, cheque wrtrs	0.01	0.03	23.2	77.8	100.0	0.004	0.004	0.01	0.05	0.00	
7142 Acting machines comput.	21.3	4.1	23.9	76.1	22.0	78.0	0.004	0.52	13.66	0.00	
7151 Machine tools for metal	6.9	18.1	1.0	99.0	12.2	87.8	0.03	0.31	2.95	11.43	
7152 Metalworking mach. nes	0.4	1.1	0.5	99.5	0.0	100.00	0.003	0.37	0.54	11.43	
7172 Skin leather working mach.	0.2	0.2	3.2	96.8	0.02	97.9	0.08	0.02	0.47	0.00	
7183 Printing binding mach.	0.4	1.9	1.0	99.0	2.1	97.9	0.08	0.08	0.76	0.54	
7183 Food machy non domestic	2.7	5.1	1.8	98.2	15.8	84.2	0.12	0.29	1.89	0.18	
7183 Const. mining machinery nes	10.1	5.3	7.9	92.1	45.3	54.7	0.31	0.27	0.83	31.06	
7185 Crushing etc. glass mach.	1.3	2.2	1.1	98.9	1.8	98.2	0.02	0.02	0.10	0.43	
7191 Heating, cooling equip.	10.4	11.3	6.7	93.3	12.4	87.6	0.33	0.22	1.48	0.71	
7192 Pumps centrifuges	13.7	24.5	7.3	92.7	13.5	86.5	0.33	0.32	1.58	1.41	
7195 Powerd tools nes	0.8	1.9	6.1	93.9	15.8	84.2	0.03	0.07	0.30	46.16	
7196 Non-elect machines nes	12.1	17.9	14.0	86.0	4.5	95.5	1.10	0.15	8.23	76.95	
7198 Other machines non electric	4.3	5.2	2.2	97.8	5.9	94.2	0.04	0.04	0.61	11.23	
7199 Machine parts acces nes	12.3	34.1	13.8	86.2	36.7	63.3	0.53	1.22	1.97	2.19	
7222 Switchgear etc.	3.3	9.3	16.4	83.6	34.4	65.6	0.07	0.33	0.58	0.44	
7232 Insulated wire cable	4.3	10.2	30.2	69.8	9.8	90.2	0.38	0.47	1.18	89.09	
7232 Electro insulated equip.	0.2	0.1	8.1	91.9	23.0	71.0	0.05	0.08	0.21	0.09	
7262 X-Ray apparatus	0.03	0.5	3.1	96.9	4.5	95.5	0.02	0.01	0.69	N.A.	
7291 Batteries accumulators	0.5	3.7	11.5	88.5	11.3	88.7	0.01	0.04	0.42	N.A.	
7292 Electric lamps bulbs	0.2	0.2	15.2	94.8	3.3	100.0	0.23	0.001	0.50	98.36	
7293 Transistors, valves, etc.	2.8	1.8	32.1	67.9	33.3	66.7	0.42	0.03	1.73	0.00	
7294 Automotive elec. equip.	2.0	3.2	40.0	60.0	15.6	84.4	1.11	0.06	0.34	58.11	
7295 Elec. measuring, control equipment	1.8	2.2	0.6	99.4	18.2	81.8	0.01	0.20	0.90	58.11	
								0.04	0.73	0.29	

	EXPORTS (millions of dollars)		EXPORTS to North South		Revealed Comparative Advantage to North South		Revealed Comparative Advantage to South		Foreign firm's share in exports a/ 1983 (1)		
	Average 1973-1975	Average 1980-1982	Av. 1973-75		Av. 1980-82		Average 1973-75			Average 1980-82	
			North	South	North	South	Average 1973-75	Average 1980-82		Average 1973-75	Average 1980-82
7296 Electro-mech. hand tools	0.1	0.3	0.0	100.0	1.7	98.3	0.004	0.004	0.25	0.53	
7299 Other electrical machinery	3.5	6.2	37.1	62.9	9.7	90.3	0.70	0.09	0.53	92.00	
7331 Bicycles non motor parts	0.3	0.1	18.0	82.0	0.0	100.0	0.10	0.10	0.44	0.00	
7333 Veh. nes non motor trailers	7.6	5.2	1.2	98.8	0.4	99.6	0.14	0.01	4.69	50.30	
Mixed b/	9.1	14.1									
- North oriented	2.1	1.8									
7118 Engines nes	2.1	1.8	28.6	71.4	55.0	45.0	3.51	2.03	2.67	33.14	
- South oriented	7.0	12.3									
7181 Paper etc. mill machinery	0.8	4.9	0.4	99.6	10.2	89.8	0.004	0.25	0.68	6.61	
7193 Mechanical handling equip.	6.2	7.4	12.9	87.1	4.1	95.9	0.25	0.04	0.72	21.61	

Noted: a/ Foreign firms were those listed in Basualdo (1984).

b/ Both Custom-built and series-built products are included.

c/ North-oriented means that 50% or more of the relevant exports were destined to the north in 1980-82.

d/ South-oriented means that 50% or more of the relevant exports were destined to the south in 1980-82.

Source: Own elaboration on the basis of figures from UNCTAD data bank and INDEC.

Custom built products augmented their share in Brazilian capital goods exports from 6.8 per cent in 1973-75 to 14.7 per cent in 1980-82. These products were almost exclusively exported to the South, with the exception of parts for locomotives (Table 6).

In the Argentine case, the share of custom built capital goods in total exports augmented from 8 per cent in 1973-75 to 21 per cent in 1980-82. However, this sharp increase is due to the ships and boats exported to the North. Otherwise, exports of custom built capital goods from Argentina were lower in absolute terms in 1980-82 than in 1973-75.

Series built capital goods were exported both to the South and to the North but most products were either South oriented or North oriented in both periods under consideration and in both countries.

Given the similar importance of the South in both periods for Brazilian exports this is to be expected. However, it is rather surprising to find a similar pattern in Argentine exports, given the growing weight of the North.

The explanation lies in the fact that while most Argentine exports of series built capital goods -which were largely South oriented in both periods- grew only 50 per cent, two North oriented products (statistical and office machines) augmented their exports four times in the period under consideration.

There are a few products which were mostly exported to the South in 1973-75 that were shifted to the North in 1980-82. They were aircrafts and electrical measuring control equipment in the Brazilian case and textil machinery, sewing machines and ball roller bearings in Argentine exports. The only product for which an opposite shift is visible is insulated wire cable in the case of Brazil.

The fact that the majority of the capital goods listed in Tables 6 and 7 has remained either South oriented or North oriented in the period under study gives a strong indication that there is a pattern of export specialization for each main destination. In other words, South oriented products seem to have technical and price features that are suited for the requirements of developing countries and cannot be easily upgraded to penetrate into the developed countries markets -except as low labour cost goods-. At the same time, the group of products which were originally exported to the South and are now exported to the North deserve to be studied carefully as well. It may well be the case that the exporters

of these products started exporting to the less demanding markets of the South and have acquired over time enough technical and marketing skills to be able to penetrate into the developed country markets.

Regarding Brazil, as is apparent in Table 6, products exported to the South are more diversified and less concentrated than those exported to the North, though diversification to this last destination is growing. Four products (ships and boats; tractors non road; construction and mining machinery n.e.s and heating and cooling equipment) accounted for 36 per cent of all capital goods exported by Brazil to the South in 1980-82. In contrast, the four leading capital goods exports to the North (piston engines; statistical machines; aircrafts and transistors and valves) accounted for 73 per cent of the value of such exports. In the case of series built capital goods, it seems that products fabricated in large batches are more frequent in exports shipped to the North while those made in small or medium batches tend to predominate in exports going to the South.

With respect to Argentina, the picture is less clear than in Brazil regarding the product composition of series built capital goods exports. While some items like statistical machines and aircrafts were mainly shipped to the North like in Brazil, this is not the case with piston engines or automotive electrical equipment. On the other hand, textile machinery and ball bearings were mainly exported to the North in the Argentine case while the opposite pattern is found in Brazil.

The leading four products exported to the North by Argentina (statistical machines; ships and boats n.e.s; ships and boats non war; aircrafts) accounted for 90 per cent of such exports. The leading four products exported to the South (machine parts, accesories n.e.s; pumps centrifuges ; machine tools for metals; non electrical machines n.e.s) accounted for 50 per cent of such exports. It should be noted that a number of leading Argentine capital goods exports like tractors non road, accounting machines and construction and mining machinery n.e.s decreased their importance not only in relative terms but also in absolute terms in the period under analysis.

b) Revealed comparative advantage

To be able to assess the comparative advantages of capital goods exported to the South as compared with those shipped to the North, the revealed comparative

advantage of each product at four digits was calculated for both destinations and both periods.

The measure used of revealed comparative advantage (RCA) is

$$RCA_{ij} = \frac{\frac{X_{ijs}}{X_{wjs}}}{\frac{X_{ims}}{X_{wms}}}$$

The measure represents the ratio between the share of country *i* in world exports (*w*) of the product *j* to the South (*s*) and the corresponding share for total manufacturing exports. An RCA higher than 1 indicates that the product performed better than all manufacturing exports in the market in question.

It is important to point out that Brazilian capital goods exports despite the fact that they increased their value six times in the period under analysis behaved worst than all manufactures exported from that country. However the RCA to the North for all capital goods increased from 0.51 to 0.92 in this period while the RCA to the South augmented slightly. Only mechanical products had a RCA higher than 1 both to the North and to the South in 1980-82.

Sixteen products have a RCA to the South higher than 1 in 1980-82. They comprise items as diverse as typewriters and domestic appliances non electric to paper mill and pulp machinery, agricultural machinery, locomotives and machine tools for metals. Most of these products increased their RCA to the South between 1973-75 and 1980-82. They were both custom built (like locomotives and ships) and series built products (like metalworking machinery).

Nine products had a RCA to the North in 1980-82 higher than one in the Brazilian case. They include series built items like piston engines -with a remarkable export performance- and automotive electrical equipment and custom made goods like aircrafts and ships and boats (both increasing in a considerable way their RCA to the North in the period under analysis).

In the Argentine case, all capital goods performed worst than all manufactured exports both in the North and in the South. The RCA of all capital goods shipped to the South decreased while it slightly increased in items exported to the North. However, non electrical machinery items had a RCA to the South higher than one

in both years and transport equipment augmented its RCA to the North, being 1.36 in 1980-82.

Fifteen products (all series built) had a ratio higher than one in exports to the South. They comprise items like cultivating machinery, harvesting machinery, accounting machinery, machine tools for metals, non electrical machinery n.e.s, etc. Most of these items had a better ratio in 1973-75 than in 1980-82, suggesting that the Argentine metalworking industry generally reduced its comparative advantage in the period under analysis regarding exports oriented to the South.

Six products (three custom built and three series built) had a RCA to the North higher than one in 1980-82 in Argentine capital goods exports. In addition to ships and boats, they were statistical machines, office machines n.e.s and aircrafts.

Before trying to compare the information on RCA with the factor content of the products exported by these two countries, it is crucial to introduce a new variable into the analysis: the participation of foreign and indigenous firms in capital goods trade.

5. Foreign and domestic firms' participation in capital goods exports

a) General picture

To be able to learn who are the main actors behind the capital goods exported by Argentina and Brazil, the share of exports accounted by foreign firms ^{7/} was calculated for most products.

As shown in Table 6, the foreign firms' share in capital goods exported by Brazil is available for all non electrical machinery items (except tractors), for several transport equipment items (being railways equipment the main exception) and a few electrical machinery goods. The information on Argentina is more complete (Table 7).

In both countries foreign firms accounted for a high share of capital goods exports: 65 per cent in Brazil and 59 per cent in Argentina ^{8/}. In the non electrical machinery sector the share of foreign firms was even higher: 76 per cent in Brazil and 68 per cent in Argentina. It is surprisingly low in transport equipment in Argentina and very high in electrical equipment in both countries (though no precise information was available for Brazil).

While in Argentina there is hardly any participation of foreign firms in custom built equipment's exports, the participation of such firms in Brazil is much lower in custom made goods than in series built products.

Although the share of foreign firms in Brazilian exports of capital goods is very high, it is nonetheless remarkable that domestic firms are actively present in many capital goods items. This is clearly in line with the observation made by Tavares that, contrary to the situation of the late 1960s, in the 1980s a small group of important Brazilian owned enterprises is able to participate in the export drive (Tavares, 1982).

^{7/} No distinction was made between majority and minority owned foreign firms and for this reason the foreign controlled portion of exports is probably overstated. Furthermore, while in the Brazilian case the Interinvest Guide seems to have considered foreign firms those where non residents account for 25 per cent or more of the capital stock, in the Argentine case this criterium was not followed in Basualdo (1984).

^{8/} It is important to take into account that IBM accounted for 22 per cent of all capital goods exported from Argentina. Without IBM, the share of foreign firms in all capital goods' exports is reduced from 59 to 48 per cent in 1980-82.

With the information available on foreign firms' participation in exports and percentage of the products exported to the South in 1980-82, it was possible to verify whether any relationship between both variables exists. While no correlation was found with the data on Argentina, this was not the case with the Brazilian information. Excluding aircrafts (in which foreign firms' participation is almost nil and exports are mainly to the North) ^{9/} a clear negative correlation between exports to the South and extent of foreign firms' participation was found in Brazil ^{10/}.

In other words, in the Brazilian case domestic firms tend to have a higher participation in those products mostly exported to the South while foreign firms have higher shares in capital goods exported to the North. However, the participation of foreign firms in products exported to the South is far from being unimportant as is clear in many items listed in Table 6 (e.g. typewriters; construction and mining machinery; paper machinery). At the same time, domestic firms have been able in some cases to penetrate into the markets of developed countries (e.g. Embraer with aircrafts; Metal Leve with autoparts; Romi with machine tools; Electromotores Weg with electric power machinery; Domenico Bestetti with mechanical handling equipment) (Guimarães et al, 1982).

Although no correlation between RCA to the North and South and foreign participation in each exported product line was found, an examination of Table 6 suggests that in the products which exhibited more comparative advantages to the South not only foreign firms had leading positions (e.g. typewriters, paper and mill machinery and statistical machines) but also domestic companies played an important role in such exports (e.g. agricultural machinery and machine tools for metals). The same can be said with respect to products with RCA higher than one to the North.

^{9/} Tractors non road for which information on foreign firms' participation was not available (but is probably very high) was also excluded.

^{10/} For all products n=41 being y= percentage of exports to the South
x= foreign firms' share

$$y = -0.46 + 99.24 R^2 = 0.31 \quad (t) = 4.14 \text{ significant at the } .01 \text{ level}$$

For non electrical machinery products n=31

$$y = -0.54 + 107.5 R^2 = 0.40 \quad (t) = 4.38 \text{ significant at the } .01 \text{ level}$$

Domestic firms had leading positions in two of these products (aircrafts and ships and boats) while foreign firms dominated exports of leading items like piston engines and statistical and office machines.

In the Argentine case is worth noting that out of the fifteen products with a ratio higher than one in exports to the South (Table 7) in only three items (e.g. insulated wire, batteries and accumulators and automotive electric equipment) foreign firms' participation was higher than the average for all capital goods exports. In other words, were mostly domestic firms those exporting the capital goods items in which Argentina demonstrated higher revealed comparative advantages in her trade with the South. Regarding products which had higher comparative advantage to the North, while statistical machines and office machines were mostly exported by one transnational company: IBM, ships and boats were exported by domestic firms.

Although it is clear that foreign firms have a high participation in Argentine exports of engineering goods, their limited export efforts (as compared with the Brazilian case) were concentrated in goods in which Argentina has reduced her participation in South bound exports.

b) Foreign controlled firms

The leading forty seven exporters of engineering goods from Brazil are listed in Table 8. These firms had exports accounting for 57 per cent of all engineering products exported in 1982 (including motor cars).

Out of the 47 listed firms, 34 are foreign controlled enterprises. These enterprises accounted for 88 per cent of the exports of the listed firms. Excluding the eight automotive firms, foreign controlled firms accounted for 73 per cent and domestic firms for 2 per cent of the value of exports by listed firms (excluding the sales of automotive firms).

Table 8 provides information on the export coefficients of leading exporters of engineering products. It is interesting to note first that exports ratios were higher in domestic firms than in foreign controlled enterprises and that the difference has increased if 1982 is compared with 1980. While domestic firms exported one third of their sales (as compared with 22.5 per cent in 1980) foreign controlled firms (excluding the automotive companies) had an export ratio of 15.7 per cent in 1982.

Table 8

LEADING EXPORTERS OF ENGINEERING PRODUCTS IN BRAZIL

Firms	Branch	Exports 1982 US\$ millions	Exports/Sales 1982 %	Exports/Sales 1980 %
<u>Foreign controlled firms</u>				
1. Fiat Automoveis*	Transport equipment	444.7	56.9	30.0
2. IBM do Brasil	Office equipment	194.1	31.24	31.3
3. Volkswagen do Brasil*	Transport equipment	177.4	10.5	18.6
4. Ford Brasil*	Transport equipment	144.0	10.5	15.5
5. General Motors do Brasil*	Transport equipment	123.0	9.7	41.8
6. Mercedes Benz do Brasil*	Transport equipment	94.7	10.7	19.3
7. Ishibras	Transport equipment	56.4	27.5	1.1
8. Caterpillar Brasil	Mechanical	46.5	17.7	29.4
9. Volvo do Brasil*	Transport equipment	38.6	56.5	20.0
10. Fiat Allis Lat. America*	Mechanical	32.7	26.9	1.2
11. General Electric do Brasil	Electrical	30.5	9.4	15.8
12. Singer do Brasil	Mechanical	30.3	24.8	25.6
13. Fiat Diesel Brasil	Transport equipment	30.2	43.1	51.1
14. Xerox do Brasil	Office equipment	29.0	11.9	2.2
15. Verolme	Transport equipment	28.3	13.8	0.0
16. Massey Ferguson Perkins	Mechanical	21.7	8.5	10.2
17. Olivetti do Brasil	Office equipment	20.1	12.20	17.6
18. Burroughs Electronica	Office equipment	18.8	13.0	25.8
19. Remington	Office equipment	16.4	46.8	50.01
20. Mannesmann Demag	Mechanical	15.1	88.9	0.00
21. Voith	Mechanical	13.7	13.1	23.4
22. Holstein Kappert	Mechanical	12.8	51.7	51.0
23. Equipetrol	Mechanical	12.6	10.4	27.7

Firms	Branch	Exports 1982 US\$ millions	Exports/Sales 1982 %	Exports/Sales 1980 %
24. Facit	Office equipment	10.5	30.9	38.0
25. Texas Instrument	Electrical	10.4	31.9	22.8
26. Volkswagen caminhões *	Transport equipment	6.3	8.2	29.4
27. Elevadores Otis	Mechanical	5,7	8.0	20.9
28. FRAPP	Mechanical	5.6	5.6	31.1
29. GTE do Brasil	Electrical	5,4	8.2	7.3
30. Lurr do Brasil	Mechanical	4.6	55.3	0.7
31. Elevadores Sur	Mechanical	4.5	16.3	3.5
32. ABC Telettra	Electrical	4.4	14.2	24.9
33. Barber Greene	Mechanical	4.2	24.6	75.9
34. Siemens	Electrical	3.5	1.7	8.5
- All foreign controlled firms		1692.2	16.5	19.9
- All foreign firms excluding automotive firms with *		633.2	15.7	17.4
Domestic firms				
1. Embraer	Transport equipment	107.6	52.0	47.2
2. Industrias reunidas CAVECO	Transport equipment	37.2	20.5	40.1
3. Milersa	Transport equipment	16.5	11.1	21.7
4. Mac Laren	Transport equipment	14.3	0.0	19.2
5. Cobrasma	Transport equipment	9.8	11.2	4.2
6. Embraco	Mechanical	7.7	7.4	12.8
7. SICOM	Mechanical	6.8	11.3	26.5
8. Ind. Villares	Mechanical	6.6	4.2	5.8
9. Terra Terra Maquinaria	Mechanical	6.3	27.4	57.7
10. Cia. Ind. Santa Matilde	Transport equipment	5.1	6.0	8.8
11. CASP	Mechanical	4.6	55.3	0.7

Firms	Branch	Exports 1982 US\$ millions	Exports/Sales 1982 %	Exports/Sales 1980 %
12. Marchesan Maq. Agric. TATU	Mechanical	3.9	7.8	4.5
13. Industrias ROMI	Mechanical	3.1	5.5	25.2
- All domestic firms		229.5	32.4	25.2
- All listed firms		1 921.75	17.0	20.0

Source: Own elaboration on the basis of the information from Gaceta Mercantil Balança Anual 1981 and 1983 and CACEX.

Export coefficients in domestic firms augmented as result of the fall in domestic sales. In fact, exports by domestic firms included in Table 8 were reduced in almost 4 per cent between 1980 and 1982. However, as internal sales have fallen by 56 per cent in the same period, export coefficients augmented.

In the case of foreign controlled firms exports augmented at a lower rate than sales for the domestic market (11 per cent and 23 per cent respectively for the non automotive companies) in 1980-82 and for this reason export ratios were lower in 1982 than in 1980.

The difficulties experienced by domestic firms in both internal and export markets clearly indicate that the recession of the 1980s has affected more the indigenous enterprises than the foreign controlled ones.

Regarding the foreign controlled firms, it is apparent that they are firms mostly operating for the domestic market, being exports a rather minor activity for the foreign firms' group as a whole. The export ratios of the 1980s were hardly higher than those available for the 1970s ^{11/}.

Given the fact that most direct foreign investment in the Brazilian capital goods sector was mainly oriented to supply the growing investment requirements of the domestic economy, it was not surprising to find these export ratios in the 1970s. It is more surprising, however, that the situation has not changed too much in the 1980s.

There are nonetheless a number of foreign controlled firms for which exports are a significant activity. Leaving aside custom built producers with occasional significant exports like Mannesmann Demag (which exported machinery for the iron and steel industry to Paraguay in 1982), a few firms making custom built items and a number of enterprises producing series-built goods can be pointed out in that connection (e.g. Voith and Ishibras, on the one hand, and on the other Fiat, IBM, Remington, Holstein Kappert, Facit, Barber Green, etc).

A good example of an enterprise making custom built products with significant exports is Voith, a German firm installed in Brazil in 1964. This firm decided to

^{11/} Export/sales ratios for foreign firms in the non electrical machinery sector increased from 15.5 per cent in 1971 to 14.5 per cent in 1978. In transport equipment the ratio in question was 16.9 per cent in 1978 (from 3.9 per cent in 1971) while in electrical and telecommunications equipment was 8.1 per cent in 1978. (Neves, 1985).



install in Brazil a substantial part of its world capacity for fabricating paper and mill machinery and has been exporting from Brazil to developing and to developed countries. Despite the importance of the Brazilian subsidiary only some limited engineering capacity has been created in that company and exports are decided by the parent company (Peñalver et al 1983).

Except Fiat and IBM, that built factories aimed at exporting substantial portion of their capacity ^{12/} and as shown below whose exports are mostly destined to the North, the remaining foreign controlled firms with significant export activities are mostly exporting to the South.

South oriented exports undertaken by foreign firms in Brazil are mainly standardized series built products that have been manufactured in the country since the 1950s. The technology for manufacturing products like motor cars, auto parts, trucks and buses, tractors, construction and mining machinery and office machines is well known but controlled by transnational corporations. Products are standardized and production volumes in the Brazilian subsidiaries are sufficient to achieve economies of scale (Araujo Jr., 1982; Araujo Jr. and Reis, 1981).

The technology for making these products was originally imported from industrialized countries but modified to the conditions of developing countries. Brazilian subsidiaries according to Araujo Jr have been playing the role of technology intermediaries ("entrepoto tecnológico" in Portuguese) and have assets that are particularly useful for the TNCs to which they belong as a basis for doing business in Third World countries ^{13/}. Of the products listed in Table 6 typewriters, tractors non road and construction and mining machinery are good examples of this situation. This role of the subsidiaries has also been suggested in a recent study on the Befiex incentives and the automotive industry (Oliveira Filho, 1984).

^{12/} Given the fact that little information is available on the changing strategies of foreign controlled firms operating in the capital goods sector it is possible that the exceptions are more numerous than what is assumed here.

^{13/} The interesting observations made by Katz and Ablin (1977) on the adaptation of received products by foreign subsidiaries to the local conditions and the exports of such products to other developing countries are likely to be applicable to the Brazilian case.

However, a product line which does not fit into this description and was included by Araujo Jr in the group of products just referred to are piston engines, the leading capital goods item in Brazilian exports. This is an area dominated by foreign enterprises as well but where the bulk of exports are shipped to industrialized countries ^{14/}.

Engines are the main product exported by General Motors do Brasil mostly to the United States (and also to Germany and Belgium) and by Fiat Diesel (mostly to Italy).

This is a development that does not fit well into the role that subsidiaries located in Brazil have been playing in the world strategy of the TNCs to which they belong. In the case of General Motors and Ford is probably related to the strategy of the world car ^{15/} however, this is not the strategy followed generally in the automotive industry in Brazil. Firms like Volkswagen in the case of motor cars, Scania, Volvo and Mercedes regarding trucks and buses have been concentrating most of their exports efforts towards developing countries.

The evidence collected by Oliveira Filho (1984) on the proportion of exports going to the countries where the parent company or subsidiaries of the same company are operating in total exports by all automotive firms in Brazil is very interesting in this connection. This ratio decreased from 37 per cent in 1974 to 28 per cent in 1980 and 23 per cent in 1981. This is indicating a trend by which motor car subsidiaries operating in Brazil have been mostly exporting their products to countries in which they do not have manufacturing subsidiaries ^{16/}. However, no information is available in that study on how individual firms like General Motors, Ford and Fiat have been operating regarding this type of trade and what sort of division of labour for the Brazilian subsidiaries is being developed.

^{14/} In Araujo Jr (1982, Table V) is shown that even in 1971 exports were mostly oriented to the North.

^{15/} These firms have been also installing factories in Mexico to export engines to the United States.

^{16/} Imports originated in the countries where the parent company or its subsidiaries are operating in total imports made by automotive companies have remained roughly in the same proportion between 1974 and 1981 (73 per cent). However, the import coefficient for the motor car companies decreased in a significant way.

In contrast to this trend on intrafirm trade in the automotive industry as a whole the opposite situation can be found in the case of statistical machines where IBM has a leading position both in Brazil and Argentina.

This transnational corporation has three production plants in Latin America (located in Argentina, Brazil and Mexico). The Brazilian plant appears to be the only plant in Latin America where IBM assembles the central processing units for medium size mainframes. However, the three plants in Latin America are specialized in peripherals or pieces of office equipment like printers that are exported to other subsidiaries of the companies where the final product is assembled. In this scheme of international division of labour most exports by subsidiaries operating in Latin America are shipped to the North where most of the plants and IBM sales of computers are located. Obviously all IBM international trade is intrafirm.

Regarding the Argentine subsidiary of IBM, 98 per cent of the value of production is exported (and was never lower than 90 per cent). The United States, Japan and Sweden are the main destinations of IBM Argentine exports. The Brazilian subsidiary has a lower export coefficient (about 80 per cent) and the main destination of its exports are also developed countries (Japan, Italy and Australia) ^{17/}.

In the case of exports of capital goods by foreign controlled firms operating in Argentina, it is very difficult to assess the current role that are playing these firms in the export effort. Of the foreign firms studied by Katz and Ablin (1977) regarding their export performance in 1969-74, three of them closed their factories in Argentina in the late 1970s (General Motors, Olivetti and Citroen) and the remaining ones have probably reduced their export activities, with the exception of IBM.

c) Domestic firms

As was pointed out above, leading domestic exporters of engineering products in Brazil had a higher export ratio than foreign firms, on the one hand, and, on

^{17/} These export coefficients refer to production of goods. If all sales in the domestic market are included (where services are very important) the ratio of exports on total sales in IBM Brazil is about 30 per cent and in Argentina about 16 per cent.

the other, increased such ratio between 1980 and 1982 but mainly because of the reduction in domestic sales.

The leading domestic firms are mostly exporting South oriented products (like ships and boats, agricultural machinery, special machines, machine tools, railways equipment), being the exports of aircrafts by Embraer the main exception.

The findings of a recent study (Guimarães et al 1982) provide interesting indications of the comparative advantages of some leading exporters of agricultural machinery and machine tools (of which only Industrias Romi and Industrias Villares are included in Table 8).

On the basis of a technology widely known, these firms have modified and adapted their products. These adaptations originally developed for the Brazilian market were instrumental in their export performance to other developing countries. For example, one firm producing plows developed a special system for regulating the disk according to the type of soil. Another firm had produced disks (on the basis of special heat treatment) specially for hard soils. These innovations proved very valuable in their export drive.

Most of the domestic firms producing items like pistons, mechanical handling equipment, construction and mining machinery, machine tools and small motors and transformers found that was possible to produce small innovations in product or processes of production in standardized items and found good export opportunities in the Third World. Some of these firms have allocated significant engineering resources to adaptations of product design and improvements in the process of production of these goods. In this connection the studies made on the machine tool industry in Brazil by Nogueira da Cruz et al (1982) are illuminating and confirm some of the previous findings of Castaño et al in Argentina (1981).

It is interesting to note that a few of the domestic firms with significant export activities have not only used exports of goods as a way of foreign expansion. Industrias Villares established six subsidiaries in Latin America (Mexico in 1972, Colombia in 1972, Chile in 1977, Uruguay in 1978, Paraguay in 1979 and Argentina in 1980) aimed at giving support to its lift exports to these countries (Guimarães, 1984). Another leading capital goods producer Dedini exported complete manufacturing plants (nine alcohol distilleries and two sugar plants) to developing countries. This firm has a leading position in the sugar and alcohol equipment market. The launching of the Alcohol National Program (Proalcool) by the Brazilian government

in 1974 led to a substantial increase in the demand of alcohol equipment. Dedini was able not only to augment its production and satisfy the domestic market but also to engage in exports on the basis of a sustained technological activity (Guimaraes, 1984).

While most of the domestic firms with engineering export activities have mostly concentrated their efforts in developing countries' markets, a few of them have been slowly diversifying their exports to the North as well.

The outstanding case in this connection is Embraer, a public firm created in 1969 to produce military and civilian aircrafts. One of the planes developed by Embraer was the Bandeirante, a small plane ideal for the conditions of developing countries that found a niche in the developed countries' short routes due to its low fuel consumption. While at the beginning most exports were shipped to developing countries (72 per cent of sales in 1973-75) the North accounted for most exports in 1980-82 (Table 6).

Embraer is a company that has built a significant engineering and design capacity while at the same time demonstrated a strong bargaining position in the technological agreement made with the US firm, Piper to produce one of its planes (Peñalver et al 1983).

A few other domestic exporters of engineering goods have also attempted to enter into the markets of developed countries. In addition to Metal Leve - a very advanced engineering firm specializing in auto parts and pistons for aircrafts engines - that has been exporting to the United States in addition to Latin America, leading machine tools makers like Romi and Nardini have entered as well into the markets of developed countries. For instance, 37 per cent of the total value of lathes (of less than 3000 kg) and 24 per cent of the value of lathes (of more than 3000 kg) exported by Romi in 1982 were shipped to the United States ^{18/}

However, it is important to recall that the export coefficient in the case of Romi was dramatically reduced from 25 per cent in 1980 (an exceptional year for the firm) to only 5.3 per cent in 1982 (Table 8). ^{19/}

Although it is difficult to assess the technological complexity of goods exported to the North as compared with those shipped to the South by domestic firms,

^{18/} According to the information compiled in Guimarães et al 1982 the percentage of Romi exports of lathes to the United States was 17 per cent in 1979 and almost insignificant before that year.

^{19/} This was due to a dramatic fall in exports (from US\$ 23 millions in 1980 to US\$ 3 millions in 1982). Total sales by Romi decreased from US\$92 millions in 1980 to US\$ 59 millions in 1982.

a rough indicator can be obtained by the value in dollars divided by weight. In the case of Romi, lathes of less than 3000 kg exported to the United States had an average value of 7 dollars/kg while those exported to Mexico (the most important destination in developing countries) had an average value of 6 dollars/kg in 1982. In the case of lathes of more than 3000 kg the average value of export to the United States was 6 dollars/kg and to Mexico 8 dollars/kg in the same year ^{20/}.

In so far as no significant differences in the unit values of goods exported to the North and South can be perceived on the basis of this rough indicator, it seems that the firm in question is basically exporting the same type of products to both markets. However, a serious answer to this question can only be given by studying this case in detail.

So far attention was paid to the export experience of Brazilian domestic firms, mostly in connection with South-South trade. Regarding Argentine firms the evidence available until the mid 1970s gives a rather similar picture to what is known about the Brazilian case. There were cases of agricultural machinery firms like Roque Vasalli -the leader firm in harvesting machinery and with a record of important innovations- exporting to other Latin American countries (Katz and Ablin, 1977).

Furthermore, the importance of Argentine exports of agricultural machinery to the Brazilian market (Brazil accounted for 47 per cent of Argentine exports of harvesting machinery to developing America in 1975) and the government requirements towards import substitution led to the installation in Brazil of a subsidiary of Roque Vasalli -that did not last for a long time-. At the same time, a leading producer of spare parts for agricultural equipment, Fortuny Hnos made a joint venture with a Brazilian distributor for manufacturing in Brazil spare parts on the basis of the design imported from Argentina. Another Argentine firm Carlos Mainero with important export activities signed a licensing agreement with the Brazilian firm Menegaz to provide the design of a special type of harvesting machine developed by the Argentine company (BID/INTAL, 1983).

^{20/} The value of lathes exported by Romi in 1982 were on average of 6.20 dollars/kg in 1980 dollars. This is higher than the average value of machine tools exports made by Brazil in 1980 (4.71 dollars/kg) and gives an indication of the increasing technological complexity of the lathes exported (Araujo Jr., 1982).

Besides agricultural machinery, a number of domestic firms exporting turn key plants to other Latin American countries were also detected and analysed (Katz and Ablin, 1978).

It is not known how these firms were affected by the policy implemented in the country since 1976 and whether their accumulated skills in the adaptation and development of minor innovations have been preserved. An answer to this question requires detail case studies that are beyond the scope of the present research project.

6. Factor and technological content of capital goods exports

a) Direct factor content

Any attempt to analyse the direct factor content of Brazilian and Argentine exports of capital goods, is complicated by the lack of appropriate statistical information. While in the Argentine census of manufactures information on capital stock is directly not compiled, in the Brazilian census is only available for branches at three digits level.

In the Argentine census, a distinction between skilled and unskilled workers is made. The skilled workers category not only includes engineers and technicians but also shop floor workers. Therefore, the distinction is not very useful to measure skill intensity of production.

To measure the skill intensity of the various capital goods producing branches the situation is better in the Brazilian case due to the data from the 1975 input output matrix. However, the proportion of senior production staff in total factory employment and of salaries of such staff in total wages is available for sixteen capital goods producing branches only.

The number of branches for which information is available on Brazil is not enough for attempting a regression analysis. However, it was used for two purposes. First, to corroborate what is already known about the skill intensity of capital goods producing branches. In this connection, it was found that the percentage of senior production staff in total personnel was higher in the sixteen branches for which information was available than for the whole manufacturing sector. Furthermore, except in two branches (railways equipment and parts and accessories) wages paid to senior staff as a proportion of total wages were higher than for the whole industry.

Second, on the basis of the branches for which comparable information is available for both Brazil and the United States (following the calculations made by Balassa (1979 b) the rank correlation for eleven branches was estimated. The Spearman correlation coefficient was very low (0.15) -and statistically non significant- indicating that the ranking is different in both countries.

Given all these constrains, the only alternative was to apply the United States data as calculated by Balassa. Although this procedure is used in many cases, it is clearly unsatisfactory. The US data for a number of comparable capital goods

producing branches are shown in Table 9 and the average direct factor content according to each destination are estimated in Table 10.

Whereas the overall capital -labour ratio was about 39 140 dollars, it was higher in North oriented exports of capital goods (41 550 dollars) than in exports shipped to the South (37 410 dollars) in the Brazilian case. North oriented exports were also more capital intensive than those exports shipped to the South in the Argentine case (Table 10).

These findings are not in line with the data provided by Havrylishin and Wolf (1981) that following the Balassa estimates concluded that South bound exports were more capital intensive than exports to the North for all manufactured exports by the NICs in 1977 ^{21/}.

However, to shed more light on this issue and taking into account that in the Balassa estimates physical capital is distinguished from human capital, it is possible to examine the incidence of each type of capital in exports to the South as compared with exports to the North. This distinction is very important because human capital is far more important than physical capital in the production of capital goods as is clear from Table 10.

While in the Brazilian case, North oriented exports had a higher physical capital/labour ratio than exports shipped to the South, this is not the case in Argentina. However, given the importance of piston engines (SITC 7115) in Brazilian exports to the North, the estimates were recalculated excluding this item whose production is very physical capital intensive. With this exclusion South oriented exports in Brazil were more physical capital intensive than North oriented ones, though the difference was not very high. The difference was neither very high in the Argentine case.

It is noteworthy that custom built capital goods that were almost exclusively exported to the South in the Brazilian case had a higher human capital intensity than series built capital goods. However, for all capital goods North oriented exports were slightly more skill intensive than South oriented ones in the Brazilian case but the difference is very small. The difference in human capital intensity in North bound exports is higher in the Argentine case and when piston engines are excluded in Brazil.

^{21/} It is striking that no attempt was made in the World Bank sponsored study to distinguish physical from human capital.

Table 9

DIRECT FACTOR CONTENT, US DATA FOR 1977

Product	Thousand dollar/man	
	Physical <u>a/</u> capital	Human <u>a/</u> capital
7111 + 7112	9.0	34.2
7113 + 7118	13.5	45.5
7114	8.8	35.1
7115	16.0	24.2
7121 to 7129	10.2	20.8
7141	10.2	25.3
7142	7.6	20.6
7143	7.4	41.6
7149	9.2	26.8
7151	11.6	41.5
7152 + 7296	9.3	24.0
7171	9.4	21.4
7172 + 7185 + 7198	8.5	39.0
7173	10.8	39.0
7181	11.0	31.1
7182	8.9	33.7
7183	7.6	29.2
7184	10.6	35.8
7191	8.3	20.5
7192	8.9	27.2
7194	8.9	33.6
7195 + 7196 + 7199	8.0	22.6
7197	15.8	30.4
7221	8.5	28.1
7222 + 7293 + 7299	7.9	22.1
7261 + 7262	5.9	42.9
7292	9.4	13.1
7294	8.4	34.3
7295	5.7	30.0
7311 to 7313	11.8	50.3
7314 to 7317	9.7	36.3
7331	5.9	15.3
7333	3.7	6.4
7341 + 7349	6.8	41.5
7351 to 7359	5.7	32.1

Note : a/ Estimates by Balassa (1979)

Source: Balassa (1979).

Table 10

DIRECT FACTOR CONTENT OF BRAZILIAN AND ARGENTINE CAPITAL GOODS EXPORTS

(dollar/worker) 1980-82

	Physical capital	Human capital	Total capital
<u>Brazil</u>			
All capital goods exports	9 380	29 760	39 140
South oriented exports	8 420	28 990	37 410
North oriented exports	10 730	30 820	41 550
Custom built	6 600	32 460	39 060
Series built	10 120	29 000	39 120
All capital goods exports excluding SITC 7115			
South oriented exports	8 150	30 790	38 940
North oriented exports	8 420	28 990	37 410
North oriented exports	6 200	34 900	41 100
<u>Argentina</u>			
All capital goods exports	8 010	31 480	39 490
South oriented exports	8 720	24 540	33 260
North oriented exports	7 390	37 310	44 700

Source: Own calculation on the basis of data from United States 1977/Census of Manufactures as estimated by Balassa (1979).

The higher human capital intensity in North bound exports is due in the Argentine case to the weight achieved by two products (statistical machines and ships and boats) whose intensity in human capital is very high as shown in Table 9. (SITC 7143 and 7351 to 7359). In addition to statistical machines, in the Brazilian case the inclusion of aircrafts (SITC 7341 to 7349) - a very human capital intensive product as shown in Table 9 - helps to explain the importance of skill intensive products in North bound exports.

Revealed comparative advantages of capital goods exported to the South and to the North for 1973-75 and 1980-82 for both Argentina and Brazil were used as independent variables in a multiple regression analysis in which physical capital intensity and human capital intensity as estimated by Balassa (1979 b) were dependent variables.

No statistically significant correlation coefficient was found in any of the regressions either for Argentina or for Brazil. Until better data (from the countries themselves) on direct factor content will become available it will be difficult to say whether these results are distorted or not for the lack of appropriate data to measure physical and human capital ratios.

b) Technological content

So far attention was paid to the direct factor content of Argentine and Brazilian exports on the basis of information which is clearly inadequate. Data for assessing the technological content of capital goods exports going to the South as compared with those shipped to the North are even less readily available.

A rough indicator normally used to measure the technological complexity of capital goods is the unit value measured in dollars/Kg. For some products like lathes exported by Romi, the leading Brazilian producer, no significant differences were found in the unit value of exports shipped to the South or to the North. For another important Brazilian exported item, i.e. construction and mining machinery (SITC 7184) the average value of exports to the North and to the South was rather similar (4.2 dollars/Kg. to the North, 4.8 dollars/Kg. to developing America and 4.7 dollars/Kg. to developing Asia and Africa). Neither significant differences were found between exports of this product from foreign controlled firms as compared with those originated in domestic firms.

Although it is possible that more significant differences can be found in other products, it is evident that without case studies of relevant exporters (both domestic and foreign controlled) it will be difficult to shed light on this crucial issue. However, from the discussion carried out in the previous section on the export activities of foreign controlled and domestic firms in the Brazilian case, a qualitative assessment of the technological content of both types of exports can tentatively be made.

Regarding custom built capital goods which are mainly exported to the South, fabrication and detailed design technology have been mastered by Brazilian firms (Erber, 1982). Reliance on technical licenses in the case of indigenous producers and on the parent company in the case of foreign controlled firms is high for basic design in a number of key products (e.g. hidro and termo electrical equipment, big electric motors, etc.). This reliance indicates that, despite the accumulation of engineering skills for fabrication and detailed design technology, leading Brazilian producers are still weak in their design capabilities, a crucial asset to be able to compete in the international market. On the other hand, the licensors or parent company may well prevent exports of these firms to the developed countries, except perhaps as subcontractors.

In so far as most custom built products in Brazil are exported to the South, no proper comparison about the technological content of products to each destination can be made. What is probably true is that indigenous companies - despite their heavy reliance in licensing agreements in some cases - are more likely to accumulate engineering skills than foreign controlled ones. The latter are generally more reluctant to transfer design technology to their Brazilian subsidiaries although there is no doubt that the subsidiaries do master the fabrication technology and in some cases (hydroelectric equipment) design technology.

In the case of series built capital goods, it is safe to say that both domestic and foreign controlled firms have been able to undertake important engineering activities as to adapt the received products to the Brazilian conditions and then to export such adapted products to other developing countries.

Although with the available information is not possible to properly measure the technological content of exports by foreign controlled firms as compared with that of domestic firms, it is probably that the observations made by Fajnzylber

(1971) on the higher technological content of products exported by international firms vis-à-vis those originated in domestic firms are no longer generally valid in South oriented exports.

However, although the technological content of South oriented exports made by foreign and domestic firms may not be very different, the impact in the exporting economy seems higher in the case of domestic firms. While indigenous machine tool producers had been devoting important resources to R&D and had established links with local research institutes, the foreign subsidiaries operating in this sector were completely dependent on their parents for the technology used (Erber, 1982). Furthermore, not only domestic firms tend to devote more resources to technological development and have deeper linkages with the environment in which they produce. The fruits on their technological efforts are also more likely to be reinvested in the economy where they are based (Chudnovsky and Nagao, 1983).

Whereas domestic firms may have been able to build up technological assets to export sizeable amounts of their production to the South and in this way to compete on similar grounds with the subsidiaries of foreign firms, they may not be able to follow the same strategy in North bound exports.

As the financial and human resources needed to upgrade the technological content of their products to be able to enter into certain niches of the Northern market are beyond the possibilities of most domestic enterprises for the time being (due to the difficult economic situation of the country), these firms may generally have to resign themselves to enter into the lower end of the developed countries market with cheap products or to look forward for a recuperating of the economic activity in the South.

7. Intraindustry trade in capital goods

In so far as intraindustry trade has been generally recognized as one of the key factors in fostering the international trade in these goods by facilitating the specialization and further technological development of capital goods producing countries, it is worth examining to what extent a similar process has been taking place in the region and between the two leading Latin American exporters of capital goods.

The simplest indicator of intra industry trade is

$$\frac{|X_i - M_i|}{X_i + M_i}$$

When the ratio is one there is no intraindustry trade and complete intra industry specialization is found in those cases in which the ratio is zero. Instead of this simple indicator, a weighted average adjusted by the trade imbalance in capital goods was used, following Aquino as quoted by Balassa (1979 a) and Balassa (1979a)^{22/}.

$$\frac{\sum |X_i^e - M_i^e|}{\sum (X_i^e + M_i^e)}$$

where $X_i^e = X_i \frac{\frac{1}{2} \sum (X_i + M_i)}{\sum X_i}$

$M_i^e = M_i \frac{\frac{1}{2} \sum (X_i + M_i)}{\sum M_i}$

The estimates shown in Table 11 for 1975 are in line with those made by Balassa for the same year, and using a rather similar procedure. Intraindustry trade with Latin America is higher than with developed countries and with developing Africa and Asia for both Argentina and Brazil in non electrical and electrical machinery.^{23/}

^{22/} Aquino made adjustments for the imbalance in total trade in manufactured goods and Balassa adjusted for the imbalance in total trade. In our case, it is more sensible to use the imbalance in total trade in capital goods.

^{23/} Intraindustry trade between Argentina and Brazil was not calculated in Balassa (197

Table 11
INTRA-INDUSTRY TRADE IN CAPITAL GOODS

	ARGENTINA				BRAZIL							
	North		South		North		South					
	1975	1982	Intra-America 1975-1982	Other Developing Countries 1975-1982	1975	1982	Intra-America 1975-1982	Other Developing Countries 1975-1982				
ALL CAPITAL GOODS	0.75	0.65	0.57	0.50	0.58	0.55	0.50	0.61	0.73	0.87	0.61	0.52
- Non electrical machinery	0.75	0.60	0.50	0.51	0.55	0.55	0.50	0.56	0.69	0.83	0.58	0.49
- Electric machinery	0.71	0.74	0.75	0.44	0.71	0.52	0.40	0.57	0.83	0.90	0.74	0.58
- Transport equipment	0.81	0.68	0.67	0.85	1.00	1.00	0.92	0.99	0.90	0.89	1.00	0.99

Source: As in table 2.

Balassa attributed the importance of intraindustry trade in the machinery branches to the complementary agreements signed in the framework of the Latin American Free Trade Association ^{24/}.

Even with the explanation offered by Balassa, his findings are somewhat unexpected given the uneven development of the trade in capital goods within Latin America. It is for this reason, that a time perspective is needed to assess the importance of the issue under consideration and an examination of the phenomenon at product level is in order.

Comparing 1982 with 1975, intraindustry trade with Latin America and with the non Latin American South in the Brazilian case has clearly decreased. The only exception is trade with Argentina. At the same time intraindustry trade with the North augmented its importance and was in 1982 higher than with South bound exports.

In the Argentine case, intraindustry trade with all destinations was more important in 1982 than in 1975, and the relative differences are maintained. Intraindustry trade is more significant in non electrical machinery for both exporting countries and almost inexistent for transport equipment.

To shed more light on the importance of intraindustry trade within these branches, the adjusted weighted averages for 1975 and 1982 were calculated for each product at four digits level for both Argentina and Brazil (Annex 1 and 2).

A number of points can be made from the examination of the intraindustry trade indicators at product level.

First, intraindustry trade is a phenomenon largely confined to series built capital goods. Except in the case of electric power machinery where intraindustry trade between Argentina and Brazil is significant -though the volume of trade is very small- no intraindustry specialization is visible in custom built products. This is particularly relevant for Brazil where such goods are very important in South bound exports. It seems that Brazil is replicating in the export front the same problem that was often pointed out in the domestic front: the excessive

^{24/} Although these agreements may have had some influence at that time, it is worth bearing in mind that a number of foreign firms were actively participating in them (e.g. in office machinery) and were apparently the main beneficiaries of these agreements (Vaitsos, 1982; Tomasini, 1977).

diversification in the output mix of custom order capital goods makers.

Second, the declining importance in intraindustry trade for Brazilian South bound exports is visible in most series built products. The main exceptions are items where transnational corporations had an active participation like statistical machines, automotive electrical equipment, type writers, accounting machines and computers, etc. In other products like machine tools and textile machinery the increase in the intraindustry trade indicator is due to the adjustment procedure used ^{25/}.

Third, in the Argentine case is more difficult to find a pattern regarding intraindustry trade in South bound exports. Intraindustry trade augmented in statistical machines, dairy farm equipment, skin leather working machinery, construction machinery n.e.s, powered tools, etc. It decreased its importance in cultivating machinery, accounting machinery, computers, insulated wire cable, etc.

Fourth, the growing importance of intraindustry trade between Argentina and Brazil is a phenomenon confined to relatively few product lines. On the one hand, statistical machines and piston engines where intraindustry trade is largely intraindustry trade in office equipment ^{26/} and transport equipment. On the other hand, items like cultivating and harvesting machinery, food machinery and heating and cooling equipment. These items are mostly manufactured by domestic firms and specialization patterns seem to have emerged between these two exporters.

While in the case of statistical machines and piston engines some sort of vertical specialization seems to have taken place in the different subsidiaries operating in the region, in the other final products a more classical horizontal specialization has emerged, though in a very embrionic form.

^{25/} Using the ratio $\frac{|X - M|}{(X + M)}$ machine tools augmented from 0.81 to 0.86 and

textile machinery from 0.75 to 0.95 in Brazilian trade with Latin America for 1975 and 1982, respectively.

^{26/} Regarding intraindustry trade, it is interesting to note that the closure of the Olivetti plant in Argentina has reduced the important trade in office equipment that used to take place between the subsidiaries of this Italian firm in Argentina and Brazil within the LAFTA complementary agreement.

Fifth, it is in this context of intraindustry trade within Latin America and between Argentina and Brazil that a reexamination of the complementary agreements is needed.

Although the complementary agreements in the machinery area are still in force it is unknown how important they actually are in the light of the changing conditions of the region and the strategies being followed by the TNCs in this area.

Finally, although intraindustry trade in North bound exports has been gaining weight, it has been largely confined to trade in parts and components (i.e. locomotive parts, aircrafts parts, office machine n.e.s, machine parts n.e.s). However, this trade does not seem to indicate a definite trend towards vertical specialization within transnational firms for the reasons discussed in section 5.

In the light of the evidence discussed in this section, although it is true that intraindustry trade has some importance especially between the two leading exporters, it is also true that in the case of Brazil a declining trend in this important indicator is visible in South bound exports. This trend is not certainly a healthy development for further expansion of South South trade, an issue to be discussed below.

8. The potential for further expansion of South South trade in capital goods

a) Summary of the findings

The picture emerging from the analysis of the experiences of Argentina and Brazil as exporters of capital goods to the South can be summarized in the following way.

The expansion of capital goods exports in the Brazilian case is one of the most significant aspects of the process of structural change implied in the growth of the indigenous production of increasingly complex capital goods. The investments made in building up a physical and technological capacity in the engineering industry has not only increased in a considerable way the domestic production of capital goods and reduced the structural trade deficit in this crucial sector. They have also been instrumental in augmenting the share of capital goods in the exports of manufactures' drive experienced in the 1970s and early 1980s by the Brazilian economy.

South oriented exports of capital goods in the Brazilian case, and to some extent in the Argentine case, cannot be characterized as the mere replication in the export front of an inefficient process of import substitution by which capital intensive goods first made for the domestic market are now exported to other developing countries. Beyond the physical capital intensity issue -which is not very relevant for most capital goods and on which the evidence is far from being conclusive- what is relevant is that capital goods exported to the South contain significant elements of technological adaptation and modification of products and processes of production for which domestic skills have increasingly been used.

Although this process of export expansion was certainly facilitated by fiscal and financial incentives provided by the government and for the relatively low wages paid to unskilled labour and in recent years to skilled personnel, there is no doubt that the export drive is not only a consequence of these factors but also reflect dynamic comparative advantages.

The role played by the TNCs in this export expansion is significant. Although originally established in Brazil for taking advantage of the dynamic domestic market, the subsidiaries have developed technological assets that facilitated their

expansion into other developing countries' markets. In the case of the automotive industry, foreign subsidiaries have certainly benefited from the export subsidies. As pointed out by some authors (Araujo Jr 1982; Oliveira Filho, 1984) these subsidies may have been redundant in the light of the role attributed to the Brazilian subsidiaries in the operations of the TNCs to which these subsidiaries belong. In other engineering exports made by foreign firms, subsidies have been also important, but certainly less significant than in a motor car industry.

Domestic firms have also played a role -though less significant than the foreign ones- in the capital goods' export drive, especially in the case of custom built products. Although dependent on suppliers from the North for some key technological inputs (like basic design) domestic firms have been able to develop an important engineering capacity that facilitated their expansion into other developing countries' markets.

Some of the dynamic elements that are clearly visible in the Brazilian experience are also present in the Argentine case, especially until the mid 1970s. What has completely diverged is the industrial policy framework in which the engineering sector operated in the late 1970s and, for these reasons, the overall current export performance of the Argentine engineering sector is below its potential.

Regarding the direction of trade, what is new is the growing importance of North bound exports of engineering products in both Argentina and Brazil. While in the case of Argentina, this is largely due to intrafirm exports made by the I&M subsidiary in the country and occasional exports of ships and boats favoured by generous incentives, in the Brazilian case the phenomenon is more complex.

On the one hand, exports of items like engines made by subsidiaries of TNCs operating in Brazil are reflecting a new role to be performed by such subsidiaries in the restructuring of the world car industry. On the other hand, the penetration of successful domestic exporters of engineering products into the developed countries' markets is an important new trend worth taking into account. Except firms like Embraer or Metal Leve that found niches in the developed countries' markets on the basis of a strong engineering capacity, it is likely that most domestic firms may be able to enter more easily into the lower end of the market for engineering goods in the North -as producer of low cost final products or as subcontractors for mechanical parts- rather than into the middle end of these

markets with more technologically sophisticated goods. While for entering into the lower end of the Northern markets only marketing skills are required, to aim at the middle end of such markets would require not only marketing but also technological skills for which important investments are needed. In the current economic recession it is hard to see how domestic firms will be able to find resources for such investments when their mere subsistence is at bay.

b) The potential for further expansion

Before discussing the potential for further expansion of South South trade in capital goods some factors that clearly affect the framework in which such trade is going to take place have to be kept in mind.

First, the debt situation in the main countries of the region which reduces in a significant manner the availability of hard currencies for imports, including those of capital goods. Second, the adjustment policies being pursued in several developing countries, following agreements with the IMF have negatively affected the capacity of the public sector to undertake investments. This situation reduces the possibilities of expanding trade in custom order capital goods that are geared to public sector investments. Finally, even if the economic activity is augmented in the second half of the 1980s in the region, a weak performance of the manufacturing sector will not lead to significant requirements for machinery and equipment.

Besides these negative short term factors, the deep changes that are taking place in significant segments of the engineering industries at international level as result of the application of microelectronics and other frontier technologies may also reduce the competitive advantages of the existing capital goods makers operating in the region. Although it is still difficult to assess the way in which these technological changes are affecting indigenous producers, there is no doubt that the process of technological development within these firms will be more constrained than it was in the past when the technological frontier was moving more slowly.

It is beyond the scope of this paper to attempt a discussion of the possible ways in which these short and long term factors will affect the potential for further expansion of South South trade in capital goods. However, in the light

of the findings of this paper and in the more restricted framework of the Latin American experience in this field, it is possible to point out some policy issues that have a bearing on the potential for expanding this type of trade.

A further expansion of South South trade in capital goods cannot be based, as it was so far, largely on the Brazilian export drive. The fostering of indigenous production of capital goods in other Latin American countries will eventually lead to an export expansion from these newcomers as well, enhancing the possibilities of intraindustry trade in the region and within the Third World. It is only through expanding intraindustry trade that the emerging engineering sector in the Third World will be able to achieve the economies of specialization which are the basis for an efficient economic and technological development of this crucial sector. At the same time, the import substitution of capital goods in other industrializing countries will open possibilities for technology transfer through licensing agreements, engineering services and establishment of joint ventures between the technologically more advanced and less advanced firms in this sector. This process will be facilitated if the leading Latin American countries and especially Brazil, will continue diversifying their exports of capital goods to the North while, at the same time, opening their markets to capital goods imports from other developing countries.

It is in this context that an important initiative has been taken in the region. Three public banks of the region - Banco de la Provincia de Buenos Aires, Banco del Estado de San Pablo and Nacional Financiera, from Argentina, Brazil and Mexico, respectively, have decided to establish in 1984 a multinational private enterprise to be called Latinequip for expanding the Latin American presence in exports of capital goods and engineering services related to these goods.

This original Latin American enterprise is going to have the following specific objectives:

- a) to promote trade in capital goods and engineering services;
- b) to obtain resources to facilitate the financing of trade in capital goods;
- c) to stimulate the process of development and transfer of technology in this sector;
- d) to foster the creation of joint ventures between capital goods producers in the region.

Latinequip is not going to be a trading company. It will act as a broker for detecting trade opportunities on behalf of companies and governments and for providing services related to finance, technology and marketing of capital goods for the three participating countries. In this way, the new company will aim at expanding trade in goods and technology by providing marketing information and financial services.

Although the three sponsoring banks are conscious of the problems ahead because of the difficult economic situation of the region and of the imbalance at industrial and trade levels between Brazil, on the one hand, and Argentina and Mexico, on the other, the new company is conceived as a modest step to exploit the potential for expanding the Latin American integration in this crucial sector for the industrial development of the region.

It is understood that Latinequip will mainly concentrate its activities in promoting trade opportunities for indigenous capital goods makers in the three participating countries. While this strategy makes clearly sense for the newly created company, there is no doubt that the further expansion of Latin American trade in capital goods has to take into account as well the strategies of the TNCs operating in this sector.

From the fact that the TNCs have used the assets developed in their Brazilian subsidiaries for expanding capital goods exports to the South, it does not necessarily mean that the same strategy will be followed in other developing countries. At the same time, the growing importance of North bound exports in which the TNCs have been actively involved is a development that deserves to be carefully studied.

In so far as the strategies of the TNCs mainly coincide with those of the exporting country -and Brazil seems an excellent example- there is no doubt that these companies have been instrumental in expanding South South exports. The situation may be far more complicated when other developing countries in which foreign companies have been actively participating in the production of capital goods will attempt to enter into the export business as well. It is then very important to follow these developments to be able to suggest policies initiatives in this crucial front of South South trade.

Finally, any further expansion of South South trade in capital goods requires

a careful consideration of the situation in the importing countries, an issue not discussed in the present paper. There are solid grounds to think that exports of capital goods originated in Latin America have price and quality advantages that led importing developing countries to shift from traditional sources in the North to the emerging exporters from the South. However, research is needed to assess to what extent this has actually happened and to suggest ways to enhance the scope of South South cooperation in this field for the mutual benefit of both exporting and importing countries.

ARGENTINA: INTRA-INDUSTRY TRADE IN CAPITAL GOODS

	North a/		South b/		Other Developing Countries		Brazil	
	1975	1982	Latin America 1975	Latin America 1982	1975	1982	1975	1982
1) Fully custom-built								
2) North oriented d/								
3) Ships and boats war	0.59	0.57	1.00	0.84	-	1.00	1.00	-
4) Ships, boats, other vessels	-	-	1.00	-	-	-	-	-
5) Ships and boat nes	1.00	0.59	1.00	0.36	-	-	-	-
6) North oriented e/								
1) Steam boilers	1.00	0.99	1.00	0.99	-	-	-	0.48
2) Boiler house plant nes	0.72	1.00	1.00	1.00	-	-	-	-
3) Steam engines, turbines	1.00	1.00	1.00	1.00	-	-	-	-
4) Nuclear reactors	1.00	1.00	-	1.00	-	-	-	-
5) Domestic appli non electric	0.99	0.92	0.90	1.00	1.00	1.00	1.00	-
6) Electric power machinery	0.82	0.89	0.46	0.04	0.46	0.99	0.48	0.44
7) Ry locomotives, steam tenders	-	-	-	1.00	-	-	-	-
8) Locomotives not steam	1.00	1.00	-	-	-	-	-	-
9) Mechan-propelled Ry cars	1.00	1.00	1.00	-	-	-	-	-
10) Passenger cars not powered	-	-	1.00	-	-	-	-	-
11) Freight cars not powered	1.00	1.00	1.00	1.00	1.00	-	1.00	-
12) Locomotive car parts nes	0.45	0.99	0.58	1.00	1.00	-	1.00	-
13) North oriented								
14) Aircraft engines inc jet	0.80	0.99	1.00	-	-	-	1.00	-
15) Gas Turbines non-aircraft	1.00	0.93	-	-	-	-	-	-
16) Statistical machines	0.88	0.72	0.37	0.26	1.00	1.00	0.40	0.26
17) Office machines nes	0.80	0.34	0.24	0.56	0.64	0.88	0.52	0.21
18) Textil machinery	0.98	0.55	0.09	0.55	1.00	1.00	0.54	0.93
19) Sewing machines	1.00	0.43	0.67	0.96	1.00	1.00	0.51	1.00
20) Ball roller, etc. bearing	0.98	0.64	0.83	0.95	0.80	0.65	0.86	0.98

60.

	North a/		South b/		Other Developing Countries		Brazil	
	1975	1982	Latin America 1975	Latin America 1982	1975	1982	1975	1982
341 Aircraft heavier than air	0.99	0.80	-	1.00	-	-	-	-
349 Aircraft parts, etc.	1.00	0.16	-	-	-	-	-	-
350 South oriented								
1) Piston engines non air	0.17	0.29	0.02	0.50	1.00	0.65	0.22	0.59
2) Cultivating machinery	0.96	1.00	0.19	0.80	-	1.00	0.79	0.76
3) Harvesting, etc. machines	1.00	0.98	1.00	0.80	1.00	-	1.00	0.20
4) Dairy farm equipment	0.04	0.95	0.92	0.45	-	-	1.00	1.00
5) Tractors non road	1.00	1.00	0.91	0.85	1.00	-	1.00	0.75
6) Agriculture machines nes	1.00	0.58	1.00	0.82	-	-	1.00	1.00
7) Type-writers, cheque wrtrs	1.00	1.00	1.00	0.96	1.00	0.99	0.61	1.00
8) Accounting machines comput.	0.97	0.53	0.02	0.91	1.00	1.00	0.09	0.77
9) Machine tools for metal	0.96	0.52	0.30	0.36	-	1.00	0.61	1.00
10) Metalworking mach. nes	0.99	1.00	0.19	0.75	-	1.00	1.00	0.92
11) Metal leather working mach.	1.00	0.99	0.65	0.31	-	1.00	0.53	0.07
12) Printing binding mach.	0.99	0.97	0.49	0.98	1.00	1.00	0.34	1.00
13) Food machry non domestic	0.80	0.46	0.82	0.60	-	-	0.92	1.00
14) Const. mining machry nes	0.42	0.06	0.48	0.01	-	-	0.98	1.00
15) Crushing etc. glass mach.	1.00	0.96	0.16	0.39	1.00	0.72	0.58	0.31
16) Heating, cooling equip.	0.05	0.74	0.89	0.19	1.00	0.94	0.18	0.70
17) Pumps centrifuges	0.41	0.40	0.02	0.40	-	-	0.43	0.24
18) Powered tools nes	0.94	0.80	0.30	0.01	1.00	0.06	0.70	0.80
19) Non-elect machines nes	0.79	0.86	0.78	0.84	1.00	0.39	0.25	0.36
20) Other machines non electric	0.96	0.96	0.48	0.35	0.25	0.53	0.24	0.47
21) Machine parts acces nes	0.09	0.01	0.06	0.33	0.93	0.98	0.65	0.14
22) Switchgear etc.	0.90	0.41	0.48	0.30	0.29	0.79	0.97	0.92
23) Insulated wire cable	0.32	0.90	0.15	0.65	0.79	1.00	0.99	1.00
24) Electric insulated equip.	0.92	0.98	0.87	0.97	-	-	1.00	1.00
25) Electric medical equipment	0.92	0.97	1.00	0.27	-	-	-	1.00
26) X-Ray apparatus	0.97	0.96	1.00	0.74	1.00	1.00	1.00	0.40
27) Batteries accumulators	1.00	0.99	0.83	0.32	1.00	1.00	1.00	0.75
28) Electric lamps bulbs	0.90	1.00	0.77	0.90	0.99	0.92	0.83	0.85
29) Transistors, valves, etc.	0.99	0.70	0.94	0.94	0.99	0.73	0.99	1.00
30) Automotive elec. equip.	0.30	0.53	0.45	0.19	0.78	0.86	0.99	0.57
31) Elec. measuring, control equipment	0.99	0.73	0.97	0.18	1.00	0.86	0.99	0.57

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	North a/		South b/		Brazil	
	1975	1982	Latin America 1975	1982	1975	1982
296 Electro-mech. hand tools	1.00	0.95	0.89	0.97	-	1.00
297 Particles, accelerators	1.00	-	-	-	-	1.00
299 Other electrical machinery	0.43	0.91	0.83	0.11	1.00	0.38
331 Bicycles non motor parts	0.35	1.00	1.00	0.41	1.00	1.00
333 Veh. nes non motor trailers	0.96	0.80	1.00	0.87	1.00	1.00
334 Invalid carriages	-	1.00	-	1.00	-	-
<u>fixed c/</u>						
North oriented						
118 Engines nes	0.17	0.21	0.99	0.40	1.00	1.00
South oriented						
181 Paper etc. mill machinery	1.00	1.00	0.57	0.50	-	0.34
193 Mechanical handling equip.	0.06	0.88	0.61	0.18	-	0.07
						1.00

Notes: a/ North means Developed Market Economy Countries

b/ South means Developing Countries

c/ Both custom-built and series-built products are included

d/ North oriented means that 50% or more of the relevant exports were destined to the north in 1980-82.

e/ South oriented means that 50% or more of the relevant exports were destined to the south in 1980-82.

Source: Own elaboration on the basis of figures from UNCTAD.

BRAZIL: INTRA-INDUSTRY TRADE

	North a/		South b/		Other Developing Countries		Argentina	
	1975	1982	Latin America 1975	1982	1975	1982	1975	1982
Mostly Custom-built								
North oriented d/								
317 Ry Locomotive, car parts nes	0.72	0.02	0.43	0.99	0.97	1.00	1.00	-
South oriented e/								
111 Steam boilers	-	0.59	-	1.00	-	1.00	-	-
112 Boiler house plant nes	0.98	0.77	0.99	1.00	-	-	-	1.00
113 Steam, engines, turbines	0.99	0.99	0.97	0.70	-	1.00	-	1.00
117 Nuclear engines	1.00	-	-	-	-	-	-	-
194 Domestic appli nonelectric	0.97	0.57	0.99	0.82	0.80	1.00	-	1.00
221 Electric power mach.	0.50	0.75	0.12	0.27	0.67	0.78	0.48	0.02
312 Ry Locomotives electric	1.00	1.00	-	-	-	-	-	-
313 Locom. not steam, not elec.	1.00	1.00	-	-	-	1.00	-	-
314 Mechan. propelled Ry cars	1.00	1.00	-	-	-	-	-	-
315 Passenger cars not powered.	1.00	1.00	1.00	1.00	-	-	-	-
7316 Freight cars not powered	1.00	0.90	-	-	-	1.00	-	-
7351 Warships of all kinds	1.00	-	-	1.00	-	1.00	-	-
7353 Ships and boats non war	0.31	0.48	1.00	0.98	0.91	1.00	1.00	-
7358 Ships and boats other vess.	-	-	1.00	-	-	-	-	-
7359 Ships and boats nes	1.00	0.99	-	1.00	-	1.00	-	-
Mostly Series-built								
North oriented								
7114 Aircraft engines inc, jet	0.80	0.77	0.78	1.00	1.00	0.94	0.58	1.00
7115 Piston engines non air	0.83	0.75	0.09	0.30	0.05	0.59	0.86	0.35
7116 Gas turbines non-aircraft	1.00	0.83	-	-	1.00	-	-	-
7143 Statistical machines	0.72	0.52	0.43	0.29	0.98	1.00	0.04	0.22
7149 Office machines nes	0.83	0.19	0.03	0.65	0.58	0.92	0.66	0.58
7295 Transistors, valves, etc.	0.72	0.27	0.45	0.82	0.88	0.99	0.85	0.75
7294 Automotive electr. equip.	0.90	0.66	0.64	0.13	0.38	0.58	0.98	0.99
7295 Elec-measuring control equip.	0.81	0.04	0.49	0.84	0.44	0.86	1.00	0.93
7341 Aircraft heavier than air	0.72	0.16	0.99	1.00	-	0.68	-	-

	North a/		South b/		Other Developing Countries		Argentina	
	1975	1982	Latin America	1982	1975	1982	1975	1982
7349 Aircraft parts, etc.	0.43	0.18	1.00	0.89	-	0.28	-	1.00
- South oriented								
7121 Cultivating machinery	0.44	0.87	0.86	0.92	0.84	1.00	0.79	0.32
7122 Harvesting, etc. machines	0.86	0.53	0.41	0.71	0.89	1.00	0.99	0.00
7123 Dairy farm equipment	0.93	0.11	0.81	1.00	1.00	1.00	1.00	1.00
7125 Tractors non road	0.94	0.59	0.69	1.00	0.01	1.00	0.99	1.00
7129 Agriculture machines nes	0.35	0.61	0.29	0.39	-	1.00	1.00	0.41
7141 Type-writers cheque-wrttrs	0.60	0.99	0.05	0.14	1.00	0.98	0.99	1.00
7142 Actting machines, computers	0.31	0.74	0.76	0.16	0.88	0.50	0.61	1.00
7151 Machine tools for metal	0.93	0.33	0.48	0.08	0.11	0.45	0.16	0.90
7152 Metalworking machinery nes	0.98	0.73	0.58	0.99	0.14	1.00	0.61	0.98
7171 Textile machinery	0.75	0.73	0.34	0.46	0.78	0.06	0.44	0.81
7172 Skin, leather working mach.	0.98	0.65	0.97	1.00	-	1.00	1.00	1.00
7173 Sewing machines	0.58	0.43	0.94	1.00	0.96	0.57	0.62	1.00
7182 Printing binding mach.	0.98	0.98	0.12	0.53	0.94	1.00	0.62	0.83
7183 Food machry non domestic	0.96	0.58	0.72	0.47	0.39	1.00	0.08	0.15
7184 Const., mining machinery nes	0.59	0.23	0.89	0.87	0.95	1.00	0.97	0.88
7185 Crushing etc., glass mach.	0.81	0.46	0.47	0.80	0.89	0.99	0.93	0.98
7191 Heating, cooling equip.	0.93	0.83	0.62	0.73	0.51	0.93	0.43	0.41
7192 Pumps centrifuges	0.50	0.25	0.62	0.50	0.15	0.80	0.14	0.53
7195 Powereds tools nes	0.93	0.24	0.47	0.62	0.07	0.02	0.07	0.59
7196 Non-elect.machines nes	0.50	0.06	0.48	0.47	0.31	0.33	0.87	0.58
7197 Ball roller, etc. bearings	0.62	0.71	0.26	0.63	0.40	0.75	0.82	0.75
7198 Other mach. non electric.	0.95	0.72	0.74	0.82	0.02	0.53	0.67	0.86
7199 Machine parts, access. nes	0.25	0.22	0.24	0.57	0.22	0.17	0.16	0.10
7222 Switchgear, etc.	0.41	0.59	0.37	0.05	0.88	0.74	0.68	0.46
7231 Insulated wire, cable	0.24	0.72	0.65	0.53	0.11	0.50	0.98	0.94
7232 Electric insulated equip.	0.98	0.84	0.77	0.92	0.50	0.17	0.86	0.86
7261 Electro medical equip.	0.94	0.85	0.87	0.46	-	1.00	1.00	1.00
7262 X-Ray apparatus	0.99	0.85	0.74	0.41	0.99	0.88	-	0.81
7291 Batteries, accumulators	0.84	0.61	0.23	0.75	0.58	0.89	1.00	0.35
7292 Electric lamps bulbs	0.07	0.94	0.87	0.27	0.94	0.90	0.99	0.86
7296 Electromech. hand tools	1.00	0.92	0.51	1.00	0.50	0.37	-	1.00
7297 Particles accelerators	-	1.00	-	-	-	-	-	-

	North a/		South b/		Other Developing Countries		Argentina	
	1975	1982	Latin America	1982	1975	1982	1975	1982
7299 Other electrical mach.	0.25	0.74	0.34	0.81	0.88	0.93	0.47	0.57
7331 Bicycles non motor, parts	0.75	0.26	0.98	1.00	0.69	1.00	-	1.00
7333 Veh. nes non motor, trailers	0.12	0.12	0.51	0.96	1.00	0.95	1.00	0.93
7334 Invalid carriages	1.00	1.00	1.00	1.00	-	1.00	-	-
Mixed c/								
- South oriented								
7118 Engines nes	0.98	0.99	0.39	1.00	1.00	1.00	1.00	1.00
7181 Paper etc. mill machinery	0.03	0.29	0.20	0.78	0.27	1.00	0.45	0.19
7193 Mechanical handling equip.	0.81	0.67	0.60	0.92	0.18	0.36	0.42	0.97

Notes: As for Annex 1.

Source: As for Annex 1.

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