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INTRA-INDUSTRY TRADE AND REGIONAL INTEGRATION BETWEEN THE MERCOSUR COUNTRIES

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MERCOSUR REPORT SERIES B.

Report

Prepared under UNDP-financed TSS-1 facility

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FORWORD

UNIDO's current work on MERCOSUR, under the UNDP-financed TSS-1 facility, is focused on three main areas within a medium-term outlook:

A. A review of the situation of specific industrial subsectors in order to identify the implications of the MERCOSUR schedule for industrial restructuring and ensuing requirements for technical assistance.

B. An assessment of the record and prospects in respect of intra-industry MERCOSUR trade as a possible engine for the creation of trade and for gains in efficiency.

C. An evaluation of the experience of the European Community countries from a MERCOSUR perspective in three specific areas:

   (i) Manpower policies, with emphasis on vocational training;

   (ii) Investment incentive regimes;

   (iii) Competition policy.

UNIDO has already published a first background paper entitled **Trade integration and industrial restructuring: The case of MERCOSUR** (PPD.225(SPEC.)), 28 January 1993. UNIDO's MERCOSUR project includes seven additional reports, as follows:

A.1 Medium-term scenarios for industrial restructuring: The pulp and paper subsector.

A.2 Medium-term scenarios for industrial restructuring: The leather and footwear subsector.

B. Intra-industry trade and regional integration between the MERCOSUR countries.

C.1 Training policies in the EC countries.

C.2 Investment incentives, subsidies and related regulations in the EC countries.

C.3 Competition policy in the EC.

D. UNIDO's MERCOSUR project: Overview report.

The analysis presented in this document covers a broad range of geographical areas and subsectors, and is in no way intended to be exhaustive. It should be seen as an exploratory effort to make a technical contribution to the decision-making process. Everything possible has been done to maintain a neutral focus from a MERCOSUR perspective. The conclusions presented in this document should not be regarded as final.

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EXECUTIVE SUMMARY

Since the mid-1980s, the four MERCOSUR countries have been engaged in important reforms of their development policies. The purpose of these reforms is to achieve greater monetary and exchange rate stability, the restructuring and modernization of industry, and the recovery of economic growth. At the same time, major efforts are being made to relaunch the regional integration process and to boost intraregional trade.

The most important results of these efforts have been the following: the further development of the agreements concluded by Argentina and Brazil with Uruguay (CAUCE and PEC), the Argentina-Brazil Economic Integration and Cooperation Programme (PICEAB) and, more recently, the Asunción quadripartite agreement establishing the Southern Cone Common Market (MERCOSUR). These achievements have laid the basis for a genuine integration of national markets, an integration in which the free movement of goods, capital and labour constitutes the chief driving force for trade and production specialization as well as the major source of job creation and new investment opportunities.

Previous experience in the area of economic integration and trade shows that these objectives can be attained if the political will to achieve association and cooperation is maintained. Between 1975 and 1989, intraregional trade in manufactured goods increased at a rate 8 per cent higher than that recorded for trade as a whole. After 1989, the further pursuit of the reciprocal tariff reduction process provided for in the bilateral agreements spurred this growth, creating better conditions for access by all concerned to one another's home markets.

An important consequence of these developments has been that a number of enterprises located in the region have become better informed regarding the opportunities for specialization that an enlarged market would offer, in addition to acquiring a wealth of experience in coping with the new conditions of competition brought about by the elimination of intraregional trade barriers. Although limited, this accumulation of market knowledge and experience is in itself a factor conducive to integration. However, the existence of other, adverse, factors makes it essential to put into place mechanisms that will permit the dissemination of this experience and its application by all the enterprises in the region.

One of the adverse factors alluded to is the persistence of severe imbalances in the pattern of intraregional trade in manufactured goods. This situation represents a major obstacle to full integration of the markets by generating protectionist pressures on the part of the sectors affected, which are afraid of losing their share of the market. Pressures of this kind can ultimately lead to official measures being taken that, while helping to check the aforementioned imbalances, jeopardize the achievement of the objective of a common market by limiting, as an unintended collateral effect, the growth of intraregional trade.

One way of avoiding this risk is by transforming local enterprises into MERCOSUR enterprises, i.e. enterprises with the ability to produce and compete in the context of an enlarged market. This requires efforts at the official level and elsewhere to spread the perception of this market as an integrated whole, just as accessible and important to the individual enterprise as its own local market currently is.

To achieve this, there must be more counselling and information regarding the conditions of competition in the associated markets, the cost relationships and consumption patterns found there, and the nature of any local requirements that may exist with regard to the quality and characteristics of potentially competitive product varieties. An in-depth knowledge of the trends encountered in intraregional trade is an essential source of this kind of information.

Analysis of these trends indicates that the growth of intraregional trade and the application of the integration agreements are taking place against a background of intense intra-industry specialization. The period between 1975 and 1989 saw steadily growing trade in products belonging to the same industrial branch. In 1990, the level of intra-industry trade between Argentina and Brazil exceeded the 50-per-cent mark, approaching the level found in trade between developed countries. During that same year, the intra-industry trade index between Uruguay and its MERCOSUR partners reached 38 per cent, a figure greater than the average recorded in trade between developing countries. It is generally found that the strength of the intra-industry component in reciprocal trade between the MERCOSUR countries is greater than in trade with other countries, and that it is increasing as the markets become more closely integrated.

All of this has important implications for the future of the integration project, primarily with reference to industrial adjustment. The fact is that the trend towards intra-industry specialization encourages this adjustment in that

it reduces its costs by making it easier to mobilize production resources and shortening the time-frame for its accomplishment. In the second place, it should be pointed out that greater intra-industry specialization usually means a greater variety of available products and more effective use of the economies of scale. This in turn means that integration can bring additional benefits in the form of lower costs and also greater volumes and better standards of consumption. In summary, the increasing strength of the intra-industry component in intraregional trade makes the MERCOSUR project more attractive and more advantageous from the point of view of the associated overall costs and benefits.

Growth in intra-industry trade is concentrated mainly in the intermediates and capital goods branches. This suggests that intra-industry specialization as an engine for intraregional trade involves an important element of complementarity in terms of inputs and investments. This is an extremely positive factor as far as industrial development and the more effective use of production resources are concerned. As it happens, the intermediates and capital goods industries are characterized by dynamic economies of scale in the sense that important opportunities for cost reduction can be achieved by focusing technical efforts on a limited number of products. Even in the case of the largest economies in the region, such as those of Argentina and Brazil, it is now illusory to seek the development of industries of this type on a basis of self-sufficiency. Seen as a regional phenomenon, intra-industry specialization makes it possible to take greater advantage of dynamic economies of scale by permitting the decentralization of the production process and, as a consequence, the incorporation of new technologies. Decentralization of this kind is made easier by integration brought about through the dismantling of tariff barriers, the freer movement of capital, and greater facilities for the formation of joint ventures and/or the exploitation of site advantages.

The extent of intra-industry trade in such sectors as machinery and chemicals, both of which are technology-intensive and require skilled labour, does not mean that the opportunities for specialization in these sectors have been exhausted. On the contrary, analysis indicates that although there are branches in which a high level of intra-industry specialization has been a constant, as is true, for example, in the case of pumping equipment, electrical goods, inorganic acids and tools, specialization processes are constantly under way place in new industries. This points to a great potential for the generation of trade. The extent to which this potential is realized will depend, among other things, on greater progress in the liberalization intraregional trade, the common tariff level adopted, and the size of the static economies of scale.

For example, in such industries as artificial fibres, pharmaceuticals and office machines, a simulation postulating a 50-per-cent reduction in reciprocal tariffs yielded a marked increase in intra-industry trade indices. In the specific case of artificial fibres it was found that the effect of a further tariff reduction of up to 100 per cent would be the emergence of intra-industry specialization as the overwhelmingly dominant factor in that industry. This case and others (e.g., office machines) demonstrate that, even though it considerably increases the level of competition in each company's local market and threatens its share of that market, integration offers new opportunities for specialization and greater participation in the associated markets.

The weak intra-industry component found in intraregional trading in consumer goods is to some extent the result of the tariff and related barriers that continue to exist. Accordingly, the elimination of these barriers could have a strong impact on the size and direction of these trade flows. In certain industries in which intraregional trade will continue to be largely managed, as, for example, the automotive sector, the degree of intra-industry specialization will depend more on sectoral agreements and corporate decisions; in others, for example, electrical home appliances, there is a sizeable potential for intra-industry specialization, the realization of which will depend on the ability of business to gain acceptance in the associated markets. Total market integration could facilitate this market penetration by bringing lower distribution costs and making imported inputs less expensive. Where this happens, industrial restructuring must be aimed at generating new product lines capable of competing in the enlarged market, and also at achieving greater productivity in lines that already exist.

1. INTRODUCTION

In March 1991, Argentina, Brazil, Paraguay and Uruguay signed the Treaty of Asunción, under which they undertook to establish a common market (MERCOSUR) within a period of five years. This decision has created great expectations among people and the press of the four countries; it has also, however, given rise to doubts and uncertainties in the business sectors directly concerned. The questions raised have to do with the economic and social risks likely to accompany the virtual dismantling of barriers to intraregional trade and the subsequent establishment of a common tariff. More concretely, there is a fear that the liberalization of intraregional trade will have substantial negative effects on trade balances, industrial production and employment. It must be noted, however, that these fears may turn out to be premature and are probably unjustified. In fact, the magnitude and thrust of the integration effort depends on economic and institutional factors that transcend trade policy and are capable of adjustment at later stages in the process.

One frequently cited example refers to the persistence of marked asymmetries between the MERCOSUR countries in the area of macroeconomic policy (UNIDO, 1993; Nofal, 1991). Sudden fluctuations in currency parities resulting from differences in inflation rates and exchange policies, for example, can seriously distort the movement of relative prices, reversing the results expected from the simple elimination of reciprocal tariffs. These distorting effects blur the rules of competition and tend to perpetuate economic inefficiency, amplifying unnecessarily the magnitude of the industrial adjustment needed in local markets. Under these conditions, the coordination of monetary and exchange rate policy called for in the Treaty of Asunción can introduce a stabilizing element into the economies of the individual countries by making it easier to distribute more fairly the costs of the industrial adjustment.

At the micro-economic level, national differences in productivity, size of companies, costs and quality of production factors, market concentration, and consumer preferences for foreign products all introduce new elements of uncertainty with respect to the results of integration in terms of industrial restructuring. These differences, together with those of an institutional character previously referred to, influence the initial competitiveness of local firms in the enlarged market and thus help determine whether they are likely to grow or shrink. This is particularly true in the case of manufacturing industries with a high requirement for physical and/or human capital and also of those that rely on a greater degree of technological innovation or production standardization. In such industries, in fact, the microeconomic performance achieved in the home market is a key to competitive success in the common market.[1] Nevertheless, the integration of national markets can alter the initial conditions of competitiveness. For example, drastic changes in relative prices as a result of tariff reductions may be offset by reductions in intermediate costs when the enlargement of the market makes it possible either to take advantage of previously untapped economies of scale or coverage or to expand the original scale. In the same way, the opening up of the economies of the associated countries creates new opportunities for mergers, investment and intra-industry specialization that make it possible to recover lost shares of the domestic and regional markets. International experience with economic integration, particularly in Europe, offers numerous examples of effects of this kind that are not contemplated in the traditional theory of international trade and customs unions but are of great importance when evaluating the costs of industrial restructuring.

One of the most commonly observed effects is the trend towards an upturn in trading in varieties of the same products. An analysis of this trend in the case of the MERCOSUR countries is the subject of this report.

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[1] In the case, on the other hand, of industries based on the availability of natural resources, the existence of comparative advantages may temporarily make up for lower micro-economic efficiency.

2. FACTORS THAT EXPLAIN INTRA-INDUSTRY TRADE

Most of the studies on this subject argue that intra-industry trade is closely linked to the existence of market imperfections and underlying production phenomena such as the presence of decreasing costs and product differentiation based on input quality (vertical differentiation) or use characteristics (horizontal differentiation) (Greenaway and Milner, 1986). Together with these phenomena, mention is also made in the literature of the processes of technological innovation and the international fragmentation of production (Kol and Rayment, 1989; Jacobsson, 1988). On the demand side, finally, certain characteristics pertaining to consumer preferences – especially low substitution elasticity between varieties of the same product, whether differentiated horizontally or vertically – contribute to the creation of intra-industry trade flows (Venables, 1987; Krugman, 1990).

The way in which these factors can combine to generate a significant level of intra-industry trade depends basically on the particular features of the industries and markets involved. For example, explanations based on the international fragmentation of production are pertinent to the analysis of intra-industry trade in intermediate products or capital goods. Also relevant in the case of the latter are the technological innovation processes that lead to increasing specialization based on product varieties within the same production branch. In the case of final consumer goods, on the other hand, explanations based on demand and monopoly competition in differentiated products become significant. In all the aforementioned cases, however, the associated aspects of market deficiency and economies of scale and coverage are also important.

In addition to inquiring into the sources of intra-industry trade, the literature contains a good deal of empirical evidence on the relationship between this kind of trade and the characteristics of the countries involved. In general, this evidence confirms the view that growth in intra-industry trade is directly related to per capita income, level of industrialization and market size as well as to a similar level of development in the countries concerned, their geographic proximity and their participation in economic integration schemes (Greenaway and Milner, 1986; Culem and Lundberg, 1986; Balassa and Bauwens, 1987, 1988). Regarding this last-mentioned aspect, it should be pointed out that the equation **greater integration equals greater intra-industry trade** does not automatically hold true. Its applicability depends on the specific conditions in the countries in question, and in particular on whether consumer preferences there are different or the same, and on how competition is played out in the market. It is recognized, however, that the effect of integration is to spur intra-industry specialization by facilitating not only sectoral specialization agreements based on product types but also corporate decisions concerning the geographic decentralization of production stages and/or specialization by local branches in specific varieties, and, in general, better use of the economies of scale.

3. BENEFITS OF INTRA-INDUSTRY TRADE

The first effect of any preferential trade agreement is to reduce the tariff-adjusted prices of imports originating in the member countries in relation to the prices of goods imported from third countries. This effect alters the direction of trade flows and affects production levels and employment in specific industrial branches. In the case with which this report is concerned, the tariff-adjusted prices in intra-MERCOSUR trade fall in relation to the prices of imports from the rest of the world. As a consequence, demand for a particular product shifts from the varieties produced outside the region to those produced by local companies. In principle and in static terms, intra-MERCOSUR trade grows while trade with the rest of the world decreases. But how these benefits are distributed among the member countries will depend on the new market conditions created by the agreement, i.e., on the one hand, greater ease of access to the associated markets and, on the other, keener competition on the home market. Where homogeneous products are concerned, these changes in the conditions of supply and demand lead to movements in production resources between one branch and another and, accordingly, to a process of interindustry specialization, whereas in the case of differentiated products the same changes can lead to greater intra-industry specialization and, frequently, to an increase in

the variety of products available in the enlarged market. Both aspects represent benefits of integration under conditions of imperfect competition and economies of scale: the first, in terms of lower costs and larger business profits; the second, in terms of greater volume and better standards of consumption.[2] Mention should also be made of the benefits relating to the forms in which industrial restructuring occurs.

Although the empirical evidence on the subject is not conclusive, analysts of trade liberalization processes generally believe that the costs of the industrial adjustment are greater when the predominant mode of specialization is interindustrial (Wonnacott, 1987; Richardson, 1989). In the first place, it is argued, the mobilization of production resources – not only capital and labour but also know-how and business skills – between different industrial branches tends to be far more costly than between similar production processes. Second, it is reasonable to expect that intra-industry restructuring can be carried out within a shorter period than interindustry restructuring. As an example, one might cite the fairly frequent case in which market integration prompts local manufacturers to abandon the production of a particular product variety in order to concentrate on another that already exists and was being produced in smaller volumes, thereby encouraging high-yield investment in scale.

4. EVOLUTION OF INTRA-MERCOSUR TRADE

A general analysis of the foreign trade of the MERCOSUR countries is given below. This analysis and the one presented in the following sections are based on annual data for the period 1975-1990 and thus refer exclusively to the situation that existed before MERCOSUR was formed. This limitation is justified by the short period of time that has elapsed since the signing of the Treaty of Asunción. The limitation is partially overcome in the last section, which examines the results of a number of industry-related simulations of the integration process under conditions of imperfect competition and product differentiation. Given the scope of this report, the trade flow analysis is limited to the manufactured goods included in sections 5 to 8 of the Standard International Trade Classification (SITC, version 1).

During the period 1975-1990 the average annual growth rate for intra-MERCOSUR trade in manufactured goods, measured in current dollars, was 8.3 per cent.

As indicated in the last line of table 1, this rate was higher than those recorded in trading by the MERCOSUR countries with other regions. Another point to be noted is that, with the exception of Paraguay, this observation also holds true for individual countries. The greatest growth in intra-MERCOSUR trade is found in the case of Uruguay, with a rate above 9 per cent, followed by Argentina, Brazil and Paraguay, in that order. It should be emphasized that this latter country is the one that relies most heavily on the MERCOSUR region in its trade relations.

Comparison of the growth rates indicated in the first and last columns of table 1 sheds additional light on the structural changes in trade patterns. It should be noted that the greater the difference between the growth rate for intra-MERCOSUR trade and the rate for total trade, the greater the probability that during the period in question there were shifts in trade towards the region as a consequence of the intraregional tariff preferences accorded bilaterally under the CAUCE (Argentina-Uruguay), PEC (Brazil-Uruguay) and PICEAB (Argentina-Brazil) agreements. Nevertheless, the current move in the four countries is towards a process of general tariff reduction. **To the degree that this process permits the convergence of national tariffs towards a common tariff that is not particularly high - for example, around 15 to 25 per cent – there is a greater likelihood that the customs union planned for 1994 will be accompanied by a net increase**

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[2] There are certain ambiguities in this last aspect that can lead to instances of economic inefficiency. This is the case, for example, when consumer preference is governed more by the prestige of an available brand than by the real or imagined qualities of the product.

in trade, since a low common tariff would minimize the distortion in the relative prices of the products generated in the region in comparison with those generated outside it.

As can be seen in table 1, the difference between the growth rates for total trade and the growth rate for intra-MERCOSUR trade peaks at over 5 percentage points in the case of Argentina, followed by Uruguay with 2.5, Brazil with 1.4 and Paraguay with 1.8.

Table 1

Evolution of total trade of MERCOSUR countries

Percentage distribution by region and country. Growth rate 1975-1990[a]

	MERCOSUR	ALADI	EEC	USA	Other	Total
Argentina						
1975-1979	14.35	10.26	31.66	19.38	24.36	100.00
1980-1984	16.83	6.77	28.43	23.35	24.62	100.00
1985-1989	21.02	9.17	25.30	19.37	25.14	100.00
Growth rate	8.65	3.08	1.32	3.90	3.26	3.48
Brazil						
1975-1979	5.51	9.48	30.43	27.82	26.76	100.00
1980-1984	7.45	10.74	24.86	27.99	28.96	100.00
1985-1989	5.76	8.10	23.71	30.28	32.15	100.00
Growth rate	7.36	5.04	3.32	6.52	7.97	5.95
Paraguay						
1975-1979	82.95	0.83	6.68	3.91	5.63	100.00
1980-1984	85.35	0.48	5.77	3.11	5.28	100.00
1985-1989	84.20	0.68	5.07	3.88	6.17	100.00
Growth rate	7.08	7.73	6.72	9.65	12.76	8.81
Uruguay						
1975-1979	60.33	1.90	18.94	10.82	8.01	100.00
1980-1984	65.54	1.75	14.42	8.59	9.70	100.00
1985-1989	66.72	2.10	13.26	8.89	9.03	100.00
Growth rate	9.45	8.89	3.90	5.58	7.63	6.94
MERCOSUR						
1975-1979	4.00	9.92	32.52	26.52	27.04	100.00
1980-1984	5.25	9.84	27.87	27.87	29.17	100.00
1985-1989	4.58	8.63	25.58	29.16	32.04	100.00
Growth rate	8.26	4.57	2.88	5.98	7.01	5.48

Source: UNIDO.

[a] Percentages calculated with respect to total imports and exports over the periods in question. Growth rate calculated as shown in the methodological appendix. For Brazil: 1975-1989.

This is clearly reflected in the changes in the share accounted for by intra-MERCOSUR trade in each country's total trade. Comparison of the five-year totals given in table 1 indicates that between 1975 and 1979 and between 1985 and 1989 this share increased by 50 per cent in the case of Argentina and by 10 per cent in the case of Uruguay. In addition, the data for the intermediate period 1980-1984 suggest that this growth was of a sustained nature. In the case of Brazil and Paraguay, on the other hand, the variations are irregular and smaller.

Figures I to III illustrate other aspects of intraregional trade, particularly the permanent surplus in Brazil's intraregional trade in manufactured goods.

Figure I

MERCOSUR: Intraregional trade in manufactures
1975-1979 averages

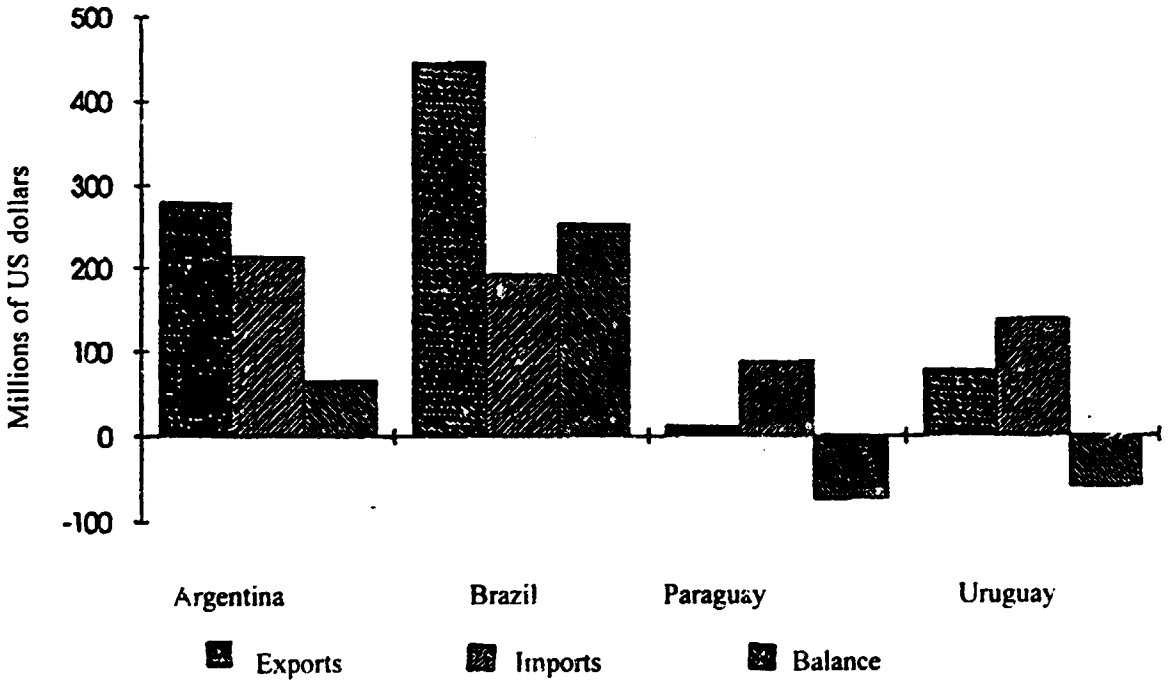


Figure II

MERCOSUR: Intraregional trade in manufactures
1980-1984 averages

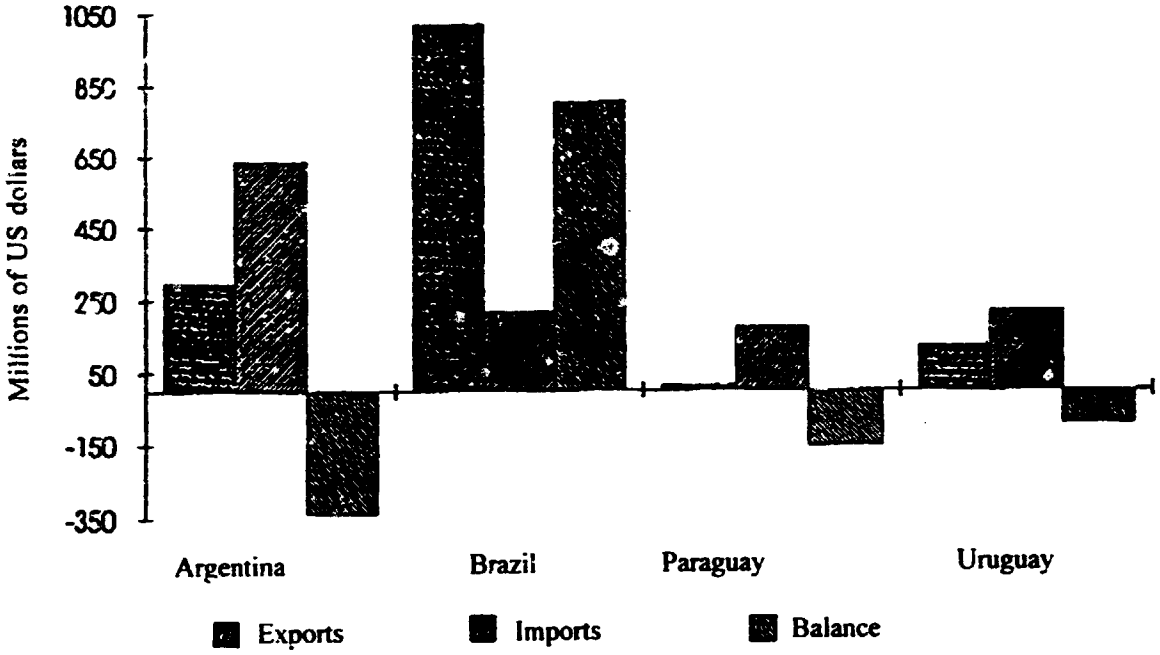
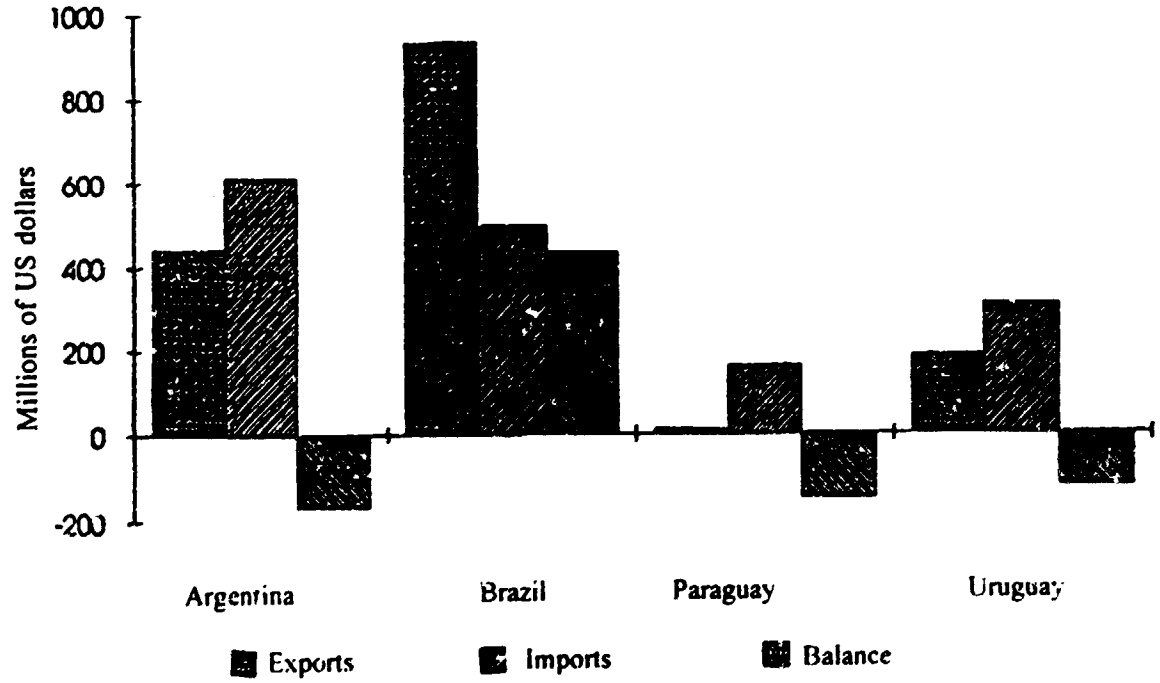


Figure III

MERCOSUR: Intraregional trade in manufactures
1985-1989 averages



In the past, this has mainly been the result of the way bilateral trade between Argentina and Brazil developed. As is evident from tables A1 and A2 in the statistical appendix, the period 1975-1979 saw some surplus in favour of Brazil in its trade with Argentina. During subsequent periods, Brazilian exports to Argentina increased by more than 250 per cent while its imports from that country hardly doubled. As a consequence, during the first four years of the five-year period 1985-1989, Argentina recorded annual deficits of nearly 400 million dollars in its trade in manufactures with Brazil. This trend was reversed in 1989, primarily as a consequence of the entry into force of the bilateral agreements, the severe Argentine recession of that year with its resultant drop in imports, some upswing in the Brazilian economy, and the sudden change in the parity between the currencies of the two countries.

Although the Argentine deficit in trade in manufactures has been partially or fully offset by the surplus in primary products, its persistence has triggered an alarm signal, particularly because of the reaction of the sectors most directly affected. At a time marked by striking differences in rates of inflation, in exchange policies and in the pace at which commercial markets are being opened, there is a heightened risk that the pressures exerted by these sectors will increase to the point of watering down the effort towards integration (Lavagna, 1991). In the face of these risks, it is essential that the reciprocal tariff reduction process be further pursued hand in hand with the strengthening of macroeconomic coordination, especially in the areas of exchange rate policy and trade policy towards third countries.

Table 2 illustrates the bilateral trade flows within MERCOSUR. The figures in the last column represent the proportion of each bilateral flow in the MERCOSUR total. By adding these figures to those appearing under subtotals, one arrives at each country's share in the total for the bilateral flows. These sums appear in the column headed MERCOSUR. As the table indicates, bilateral transactions between Argentina and Brazil constitute the main trading axis within MERCOSUR. These transactions represented 52 per cent of the aggregate total during the period 1985-1989. It is followed, in order of magnitude, by the Brazil-Uruguay axis with 23 per cent, the Argentina-Uruguay axis with 13 per cent, and the Brazil-Paraguay axis with 11 per cent. The remaining bilateral flows account for less than 5 per cent of the total. It should be noted that, with only very slight modifications, this ranking repeats that of previous periods. The most obvious change is in bilateral trade between Uruguay and its two largest partners. The trend here is towards growth in this country's trade with Brazil at the expense of its trade with Argentina.

An analysis of disaggregated regional exports sheds additional light on the changes that have occurred in the structure of intra-MERCOSUR trade (table 3). The products have been ranked according to their percentage share in exports during the year 1990. The figures in brackets indicate the position occupied by the product in each year's ranking. As is evident, intermediate and capital goods (electrical and non-electrical machinery and transport equipment) are among the highest-ranking products throughout the period. Exports of chemical products, in turn, are on the rise, increasing from seventh place in 1975 to second place in 1990. A similar development can be seen in the case of plastics, which have moved from fifteenth to seventh place, and with leather products, which have risen from twenty-first to ninth place. Among the products that have slid most in the rankings are those of metallic and non-metallic minerals. Finally, attention is invited to the insignificant role of consumer goods such as clothing, perfumery products, footwear and furniture in intra-MERCOSUR trade.

Table 2

Bilateral trade flows as a percentage of total intra-MERCOSUR trade

Source country	Trading partner			
	Argentina	Brazil	Paraguay	MERCOSUR
Uruguay				
1975-1979	16.22	16.12	0.71	33.05
1980-1984	12.46	14.04	0.58	27.08
1985-1989	12.79	22.57	0.32	35.68
Paraguay				
1975-1979	5.18	9.49	0.71	15.38
1980-1984	3.67	10.92	0.58	15.17
1985-1989	1.80	10.58	0.32	12.70
Brazil				
1975-1979	52.28	25.61	-	77.89
1980-1984	58.34	24 96	-	83.30
1985-1989	51.95	33.15	-	85.10
Argentina				
1975-1979	73.68	-	-	73.68
1980-1984	74.47	-	-	74.47
1985-1989	66.54	-	-	66.54
Subtotals				
1975-1979	73.68	25.61	0.71	100.00
1980-1984	74.47	24.96	0.58	100.00
1985-1989	66.54	33.15	0.32	100.00

Source: UNIDO.

Table 3

Percentage distribution of intra-MERCOSUR exports by SITC divisions
(Selected years)

Division	1975		1980		1985		1990	
Non-electrical machinery	21.90	(01)	20.34	(01)	15.04	(01)	12.94	(01)
Chemicals	4.67	(07)	4.97	(06)	10.65	(03)	12.17	(02)
Transport equipment	9.63	(03)	14.18	(02)	10.88	(02)	9.06	(03)
Electrical machinery	8.81	(04)	9.84	(03)	8.74	(04)	7.32	(04)
Textiles	6.48	(05)	4.17	(07)	5.25	(08)	6.84	(05)
Iron and steel	11.67	(02)	7.48	(04)	6.35	(06)	6.21	(06)
Plastics	1.80	(15)	3.13	(11)	7.04	(05)	5.64	(07)
Other chemicals	2.75	(11)	2.37	(13)	3.91	(09)	4.27	(08)
Leather manufactures	0.75	(21)	0.78	(21)	5.35	(07)	4.17	(09)
Paper	1.97	(13)	2.53	(12)	2.18	(15)	4.09	(10)
Rubber manufactures	2.82	(10)	2.15	(14)	2.08	(16)	3.67	(11)
Metal manufactures	4.16	(09)	4.03	(08)	3.29	(10)	3.29	(12)
Non-metallic mineral manufactures	6.12	(06)	5.31	(05)	2.74	(12)	3.14	(13)
Colouring materials	0.83	(20)	1.08	(19)	1.71	(17)	2.52	(14)
Miscellaneous	4.39	(08)	3.69	(09)	2.50	(13)	2.42	(15)
Clothing	2.71	(12)	3.47	(10)	1.63	(18)	2.39	(16)
Non-ferrous metals	1.94	(14)	1.21	(18)	2.39	(14)	2.27	(17)
Instruments, watches, etc.	0.98	(18)	1.92	(15)	2.80	(11)	1.94	(18)
Perfumery and cleaning products	1.68	(16)	1.50	(17)	1.54	(19)	1.66	(19)
Fertilizers	0.67	(22)	0.46	(25)	1.06	(20)	1.16	(20)
Pharmaceutical products	0.84	(19)	0.96	(20)	0.96	(21)	0.95	(21)
Wood products	1.37	(17)	1.68	(16)	0.34	(24)	0.65	(22)
Footwear	0.15	(26)	0.50	(24)	0.59	(22)	0.48	(23)
Sanitary, lighting, etc. products	0.27	(24)	0.67	(23)	0.25	(25)	0.23	(24)
Furniture	0.35	(23)	0.76	(22)	0.40	(23)	0.18	(25)
Travel goods	0.09	(27)	0.39	(27)	0.04	(27)	0.14	(26)
Explosives	0.19	(25)	0.41	(26)	0.25	(26)	0.13	(27)
Petroleum products	0.00	(28)	0.05	(28)	0.02	(28)	0.07	(28)
Total	100.00		100.00		100.00		100.00	

Source: UNIDO.

Figures in brackets indicate each year's ranking.

5. PROBLEMS OF MEASUREMENT

The measurement of intra-industry trade has been the subject of intense debate (Greenaway and Milner, 1986). One of the most controversial points concerns the statistical problem of category aggregation. This term alludes to the discrepancies that arise in measuring intra-industry trade when "industries" are defined according to the product groups adopted by the international trade classification systems. Table 4 offers an example of this type of problem. The "industries" analysed in the table are those that, in 1985, accounted for the highest intra-industry trade indices in Argentina-Brazil bilateral trade flows for final consumer goods groups defined under three-digit headings in the SITC (Rev.2). A further breakdown of this trade into four-digit headings shows just how illusory these results are. With products broken down to this level, in fact, two of the industries – electrical household appliances and photographic apparatus and equipment – shift in classification to the point of becoming representative of almost total interindustry specialization. In the case, on the other hand, of the plastics articles industry one finds a total concentration of the trade in the "not elsewhere specified" subgroup, which, by definition, encompasses a broad and heterogeneous range of products.

Table 4

High intra-industry bilateral trade flows at three-digit level broken down into four-digit groups, 1985

SITC	Description and subgroup	Exports[a]	Imports[b]	GL index
775	Household appliances	2 295	2 528	95.17
	775.2 Refrigerators	0	411	0.00
	775.4 Electric shavers	2 295	0	0.00
	775.7 Electromechanical appliances	0	1 354	0.00
	775.8 Thermal appliances	0	763	0.00
881	Photographic apparatus and equipment	187	578	48.89
	881.1 Cameras	14	560	0.05
	881.3 Other	173	18	0.19
892	Printed matter	287	626	62.87
	892.1 Books	257	455	72.19
	892.8 Other	30	136	36.14
893	Articles of plastics	154	585	41.67
	893.9 n.e.s.	154	580	41.96

Source: Behar (1991).

[a] Exports from Argentina to Brazil in thousands of dollars.

[b] Imports into Argentina from Brazil in thousands of dollars.

It should be pointed out at this point that none of the existing classifications is perfectly suited to the objectives pursued in analysing intra-industry trade (Gray, 1988). Still, there is a general consensus that, for the purposes of documentary and descriptive studies, the three- or four-digit SITC classifications provide a reasonably approximate definition of industry (Greenaway and Milner, 1986). Most of the empirical results presented here have been arrived at by applying this criterion. Nevertheless, these results will be compared in section 6 with the results of intra-trade measurements based on much more rigorous criteria of product differentiation.

A second type of problem refers to the selection of the most suitable index. In most of the empirical studies on this subject, the index proposed by Grubel and Lloyd (GL) (Grubel and Lloyd, 1975) has been adopted. This index is obtained by subtracting from one the proportion of the absolute value of an industry's net trade balance in the total for the trade in question, and is usually expressed as a percentage. This being the case, the GL index moves towards the upper limit of 100 as intra-industry trade intensifies, and approaches zero when, conversely, the trend is towards total interindustry specialization. Various adjustments to the Grubel and Lloyd index have been suggested for the purpose of avoiding the deviation caused by the presence of trade imbalances at the aggregate level. One such adjustment has been proposed by Aquino (AQ) (Aquino, 1987), who assumes that the deviation is proportionally distributed among all the industries. In the case of both the GL index and the AQ index, there exist aggregation formulae that provide measurements of intra-industry trading intensity for industry groups, country groups and trading partner groups (see the methodological appendix).

Various students of intra-industry trade have concluded that the different indices are closely correlated (Erzan and Laird, 1984; Tharakan, 1986). This would lend a certain flexibility to their use. Nevertheless, doubts persist as to which of the indices yields the lowest statistical deviation, particularly with regard to aggregated measurements (Greenaway and Milner, 1986). For the purpose of verifying the hypothesis that, at the disaggregated level, the selection of the index type does not substantially affect the ranking of industries according to the scale of intra-industry trade, a calculation has been made here of the rank correlation coefficients (Spearman) for GL and AQ indices for three-digit industries in different years and with respect to different trade flows (table 5). It will be seen that there is a close correlation between industry rankings based on either index. A particular point of interest is that the coefficients are above 0.9 in most of the cases of intra-MERCOSUR bilateral dealt with in the table.

Accordingly, in the discussion that follows, preference will be given to the Grubel and Lloyd method in calculating the intra-industry trade indices at the four-digit level of aggregation. Adjusted Aquino indices will also be presented for a higher level of aggregation. In this way, the intra-industry intensity indices in MERCOSUR trade can be compared with the results from other sources, which relied on Aquino-type measurements.

6. GENERAL CHARACTERISTICS OF MERCOSUR INTRA-INDUSTRY TRADE

As indicated in section 4, the focus in this section will be on the intra-industry trade indices of the bilateral trade flow within MERCOSUR. First, there will be a review of the intra-industry trade indices for all the transactions recorded in four selected years. Second, the product categories with the greatest intensity of intra-industry trade over the period 1975-1990 will be identified for each country. Third, there will be an examination of the influence of a number of factors capable of altering the intra-industry trade model of the MERCOSUR member countries. As has already been noted, two-way trade between Argentina and Brazil represents the major integration axis within MERCOSUR, which is why this axis is examined in greatest detail.

6.1 Intra-industry trade in manufactured goods

Table 6 shows GL intra-industry trade indices for all the transactions in manufactured goods within the region in selected years. These indices have been calculated at the four-digit level of aggregation. The table also analyses trade between the MERCOSUR member countries and other geographical areas for the purpose of verifying the hypothesis that geographical proximity and/or the existence of trade agreements affects the index figure.

Tab!e 5

Spearman coefficients for correlation of Grubel and Lloyd and Aquino intra-industry trade indices, 1975, 1980, 1985, 1990*

Trading partner	Reporting country			
	Argentina	Brazil	Paraguay	Uruguay
1975				
Argentina		0 9658**	1 0000**	0 9988**
Brazil	0 9557**		0 9985**	0 9888**
Paraguay	0 9998**	0 9699**		1 0000**
Uruguay	0 9925**	0 9859**		
MERCOSUR	0 9725**	0 8845**	0 9984**	0 9913**
LAIA	0 9915**	0 9722**	1 0000**	0 9904**
EEC	0 8586**	0 7313**	0 9974**	0 9980**
USA	0 9107**	0 7086**	1 0000**	0 9998**
Other	0 8188**	0 6525**	0 9991**	0 9883**
All	0 7003**	0 5870**	0 9910**	0 9690**
1980				
Argentina		0 9281**	0 9971**	0 9993**
Brazil	0 9248**		0 9993**	0 9327**
Paraguay	0 9671**	0 9993**		0 9956**
Uruguay	0 9975**	0 9031**	1 0000**	
MERCOSUR	0 8916**	0 8382**	0 9878**	0 9375**
LAIA	0 9894**	0 9882**	1 0000**	0 9988**
EEC	0 9084**	0 8279**	0 9982**	0 9929**
USA	0 8833**	0 8561**	0 9999**	0 9913**
Other	0 9015**	0 9768**	0 9968**	0 9402**
All	0 7533**	0 9462**	0 9888**	0 9078**
1985				
Argentina		0 9647**	0 9968**	0 9942**
Brazil	0 9686**		1 0000**	0 9676**
Paraguay	0 9844**	0 9965**		0 9796**
Uruguay	0 9872**	0 9605**		
MERCOSUR	0 8721**	0 9405**	0 9976**	0 9293**
LAIA	0 9569**	0 9804**	0 9976**	0 9995**
EEC	0 9449**	1 0000**	0 9971**	0 9934**
USA	0 9693**	0 9027**	0 9989**	0 9926**
Other	0 9968**	0 8361**	0 9990**	1 0000**
All	0 9284**	0 8316**	0 9920**	0 9871**
1990				
Argentina		0 9382**	0 9832**	0 8934**
Brazil	0 9872**		0 9827**	0 9877**
Paraguay	0 9798**	0 9757**		0 9918**
Uruguay	0 9030**	0 9979**	0 9938**	
MERCOSUR	0 9332**	0 9998**	0 9658**	0 9479**
LAIA	0 8979**	0 9629**	0 9905**	0 9986**
EEC	0 9839**	0 9832**	0 9949**	0 9924**
USA	0 9941**	0 9563**	0 9938**	0 9999**
Other	0 9745**	0 8313**	0 9758**	0 9890**
All	0 9768**	0 8570**	0 9639**	0 9624**

Source UNIDO

* Brazil 1989

Table 6

MERCOSUR intra-industry trade indices by trading partner (SITC 5-8, calculated at four-digit level of aggregation according to Grubel and Lloyd)

Trading partner		Reporting country				
		Argentina	Brazil*	Paraguay	Uruguay	MERCOSUR*
INTRA-MERCOSUR						
Argentina	1975	-	-	-	-	-
	1980	-	-	-	-	-
	1985	-	-	-	-	-
	1990	-	-	-	-	-
Brazil	1975	24.93	-	-	-	-
	1980	23.83	-	-	-	-
	1985	26.67	-	-	-	-
	1990	53.78	-	-	-	-
Paraguay	1975	0.23	4.03	-	-	-
	1980	3.57	0.11	-	-	-
	1985	2.07	0.06	-	-	-
	1990	1.40	4.84	-	-	-
Uruguay	1975	14.82	3.36	0.00	-	-
	1980	27.18	9.77	0.00	-	-
	1985	24.32	19.06	0.00	-	-
	1990	30.49	21.7[illegible]	2.42	-	-
MERCOSUR	1975	29.00	27.12	0.25	11.97	-
	1980	40.52	19.72	0.5[illegible]	27.01	-
	1985	36.20	22.31	0.21	33.80	-
	1990	54.42	41.51	2.57	37.63	-
EXTRA-MERCOSUR						
LAIA	1975	9.77	15.00	0.00	4.03	15.93
	1980	22.65	11.16	0.66	4.89	17.10
	1985	21.97	12.89	0.36	6.14	18.00
	1990	22.98	11.70	3.58	12.28	17.33
EEC	1975	8.62	7.89	0.37	0.94	8.77
	1980	8.26	18.78	0.27	3.25	19.56
	1985	11.54	25.45	0.59	4.48	26.46
	1990	26.41	29.69	1.30	5.62	29.97
USA	1975	7.83	8.38	0.00	3.03	8.81
	1980	9.90	18.41	0.06	3.53	21.66
	1985	13.91	25.46	0.20	2.63	27.09
	1990	22.30	26.57	2.19	2.76	28.38
Other	1975	8.76	12.57	0.25	1.32	14.58
	1980	8.54	23.17	0.34	4.17	28.79
	1985	16.29	17.69	0.12	5.96	21.13
	1990	19.91	20.61	0.32	9.82	23.01
All	1975	20.80	19.66	1.02	9.59	23.52
	1980	20.95	34.29	0.56	17.49	43.54
	1985	32.29	34.34	0.30	21.82	41.03
	1990	43.19	35.77	2.95	27.55	41.56

Source: UNIDO.

* 1990 indices are based on 1989 data.

The first thing to be noted is that the intra-industry intensity of bilateral trade between Argentina and Brazil is, generally speaking, higher than that of the other trade flows, exceeding 50 per cent in 1990. In that same year, both countries also recorded the highest indices in intra-MERCOSUR trade, with 54 and 42 per cent respectively. These figures are close to those recorded in trade between industrialized countries (UNIDO, 1993; Greenaway and Milner, 1986). This fits the hypothesis that the larger the size of the domestic market in both countries and, accordingly, the greater the economies of scale, the greater the diversification of products and trade in them. This finding also supports the expectation that trade liberalization between developing countries should accelerate the process of intra-industry specialization. This seems evident, in fact, when one observes the sharp rise in the indices in question in 1990, the year in which the integration agreements between Argentina and Brazil, which preceded MERCOSUR by three years, came fully into force.

Although to a lesser extent than in the preceding case, the trend towards intra-industry specialization can also be seen in the case of trade between Argentina and Uruguay and in Uruguayan trade with its MERCOSUR partners as a whole. It is significant that the Uruguay-MERCOSUR index exceeded 30 per cent in 1985 and, accordingly, was higher than the average recorded that year for trade between countries at a development level similar to that of the MERCOSUR group (UNIDO, 1993).

Comparison of the intra-MERCOSUR indices with those given in the lower portion of table 6 sheds additional light on these aspects. In the cases of Argentina, Brazil and Uruguay, one finds a higher degree of intra-industry specialization in reciprocal trade than in trade with other geographical regions. This can be observed in the entries corresponding to the line item entitled MERCOSUR. It is also evident that the Argentina and Uruguay indices for trade between these two countries and other members of the Latin American Integration Association (LAIA) are generally higher than the indices for trade with the remaining countries and economic areas covered in the table. The reverse in true in the case of Brazil. Both these facts have to do with the greater volume and diversification of Brazilian trade outside the region and with the circumstance that the LAIA agreements are less important for that country's overall trade than for Argentina and Uruguay.

Finally, it should be noted that **Paraguayan trade is marked by a clear trend towards interindustry specialization**, in terms both of trade with that country's MERCOSUR partners and of the remaining trade flows. This observation is in line with the hypothesis that intra-industry trade levels are directly related to the levels of development and per capita income. Empirical evidence has shown the same observation to be true in many contexts and, recently, in the case of Latin America (Lord, 1992).

Similar conclusions can be drawn from an examination of table A4 in the statistical appendix. That table presents Aquino indices computed at the three-digit level, which are comparable with those calculated by Erzan and Laird (1984) for the period 1965-1980. Of particular interest are the indices found by those authors for the reciprocal trade of 10 developing countries that are among the principal exporters of manufactured goods (PEM) and which include Argentina, Brazil, Mexico, Yugoslavia and the Republic of Korea. This aggregate index stood at 41 per cent in 1980, which is distinctly lower than that recorded by Argentina and Brazil in their trade with their MERCOSUR partners during the same year (56 and 46 per cent, respectively) and slightly higher than that recorded by Uruguay (40 per cent), according to table A4. During that same year (1980), the Aquino index calculated by Erzan and Laird for the trade of the PEM group with the group of industrialized countries was 38 per cent, again lower than that for trade between MERCOSUR and the United States and the same as that for MERCOSUR trade with the European Economic Community (EEC).

Finally, figures IV to VI present a retrospective view, year by year, of the evolution of the principal intra-industry trade indices for Argentina, Brazil and Uruguay. There is no chart for Paraguay since in none of the relevant cases are that country's indices higher than 6 per cent. In the cases of Argentina and Uruguay, the fact that intra-industry trade is most intense in trading within the region (MERCOSUR and LAIA) is a constant phenomenon during the period in question. In the case of Brazil, on the other hand, intra-industry trade within MERCOSUR has developed along lines similar to that country's trade with the developed nations.

Figure IV
Argentina: Evolution of intra-industry trade

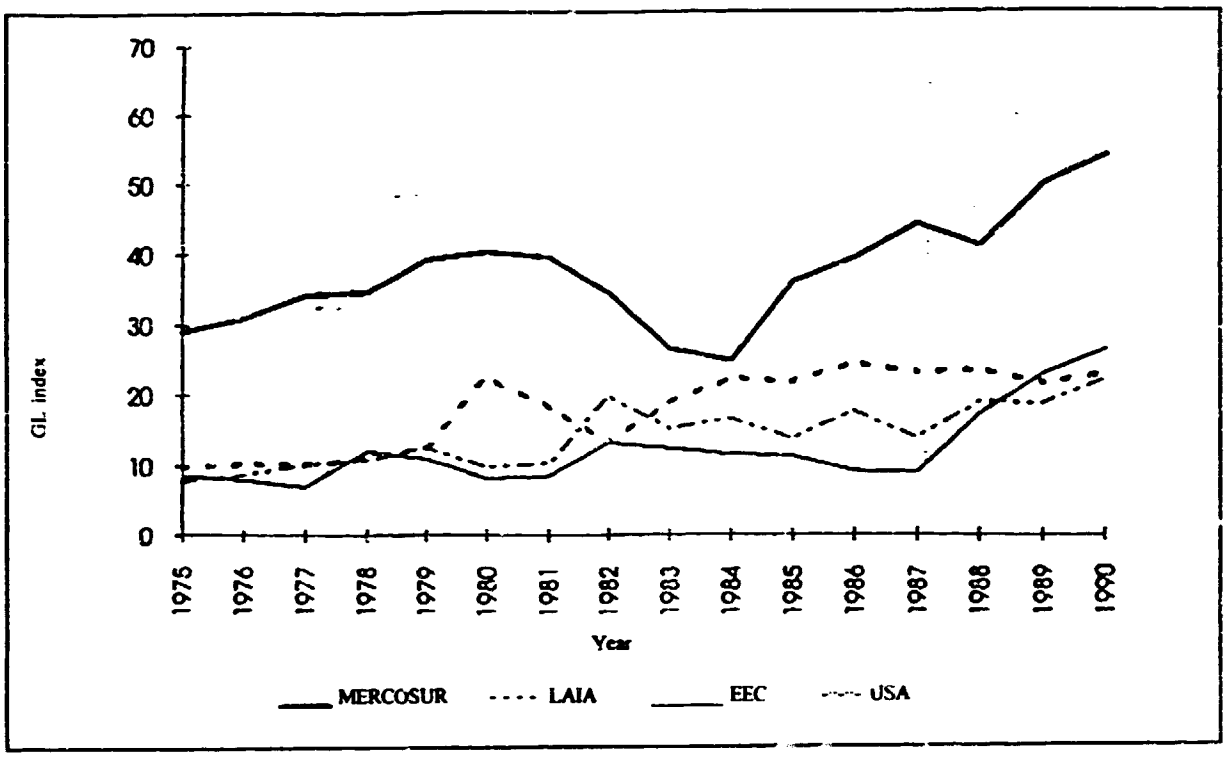


Figure V
Brazil: Evolution of intra-industry trade

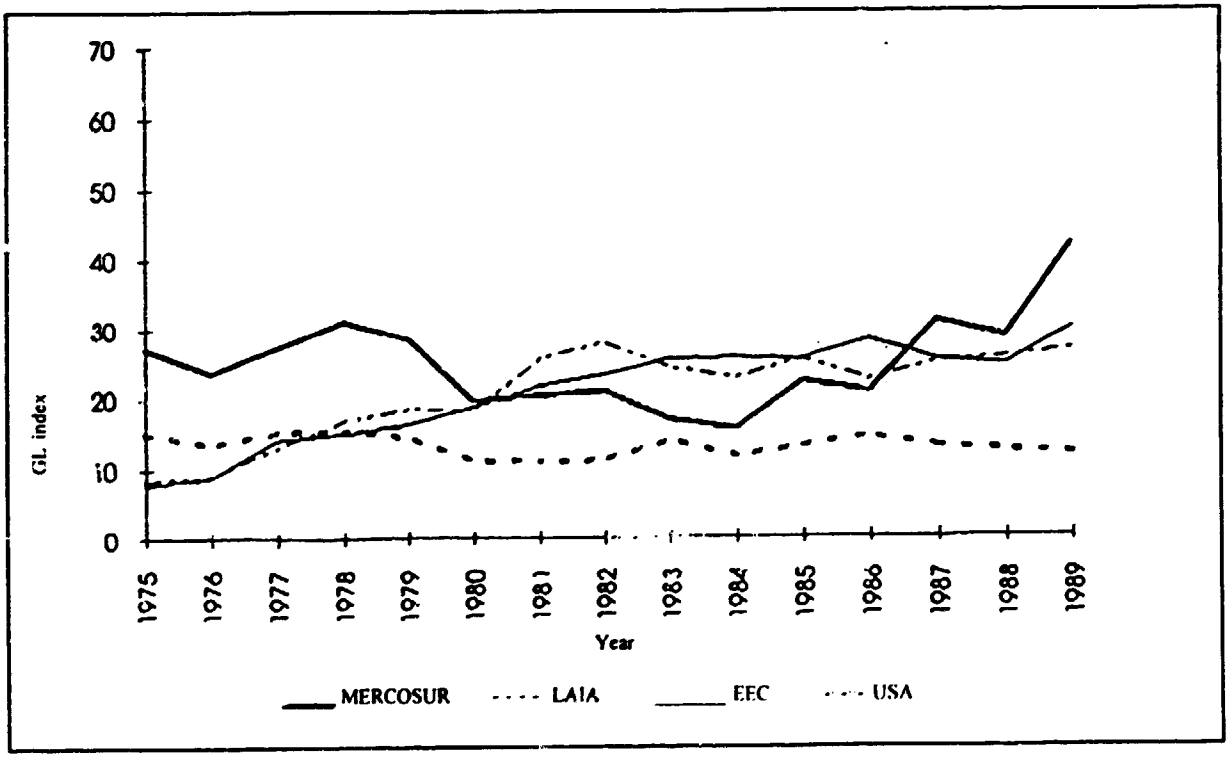
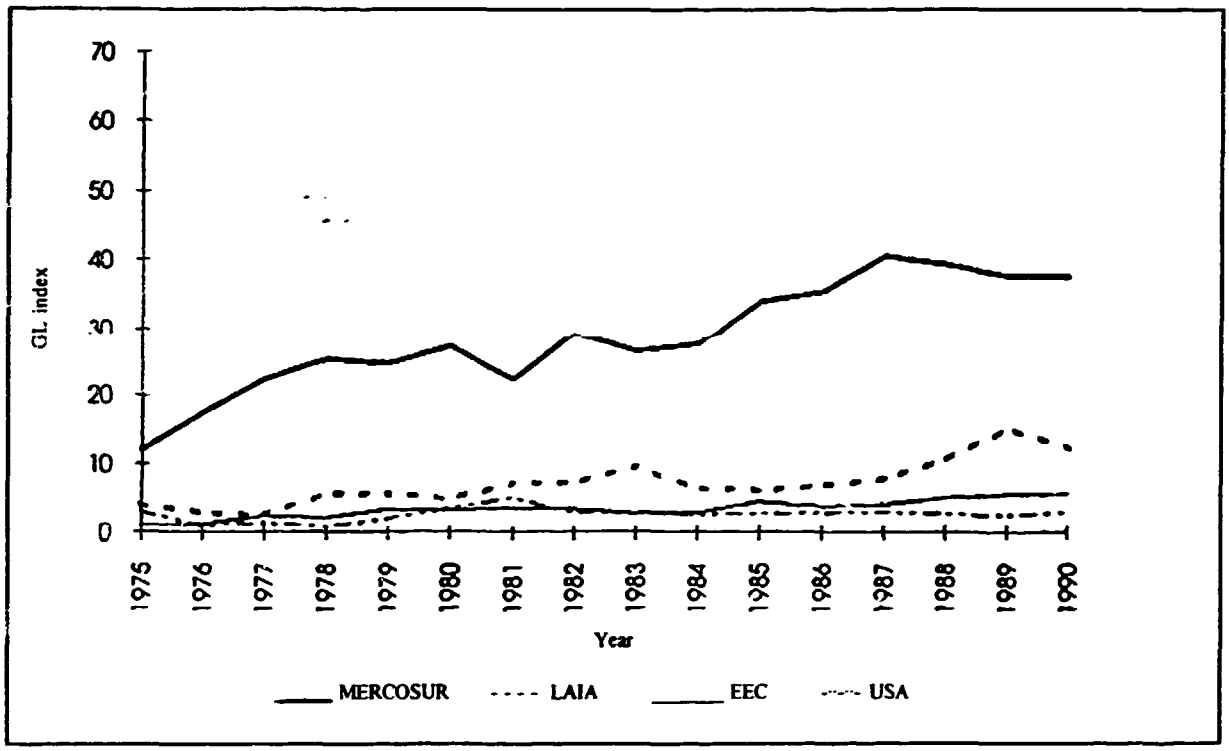


Figure VI

Uruguay: Evolution of intra-industry trade



Source: UNIDO.

One question that arises has to do with how stable intra-industry trade is when different trade flows are considered. The Spearman correlation coefficients in tables 7 and 8 show the degree of correspondence in 1989 between the intra-industry intensity recorded in trade among the MERCOSUR members and that recorded in trade with other trading partners. It will be observed that the structure of intra-industry trade varies considerably depending on the trading partner in question. Excluding the case of the overall trade flow, most of the coefficients are below 0.5, and there are numerous cases of simultaneous intra- and inter-industry specialization, depending on the direction of the trade.

The last line of table 7 reflects the changes that occurred in the composition of intra-industry trade within MERCOSUR during the period 1975-1990. The fact that the coefficients are as low as they are indicates that these changes have been far-reaching. This suggests that the **dynamic growth of intra-industry trade within the MERCOSUR bloc is connected not with an increase in product differentiation within a given industry but with the emergence of specialization processes within new industries.** Similar conclusions may be drawn from tables A5 and A6 of the statistical appendix.

Table 7

Spearman correlation coefficients between MERCOSUR intra-industry trade indices
(Grubel and Lloyd indices at four-digit level of aggregation)

	MS-Argentina	MS-Brazil	MS-Paraguay	MS-Uruguay	MS-LAIA	MS-EEC	MS-USA	MS-Other
1989								
MS - Argentina	1.00							
MS - Brazil	0.22**	1.00						
MS - Paraguay	0.16*	0.06	1.00					
MS - Uruguay	0.22**	0.38**	0.06	1.00				
MS - LAIA	0.13	0.07	0.13	0.32**	1.00			
MS - EEC	0.18**	0.06	0.03	0.17*	0.11	1.00		
MS - USA	0.15*	0.25**	0.00	0.11	0.03	0.37**	1.00	
MS - Other	0.20**	0.24**	0.02	0.23**	0.10	0.22**	0.38**	1.00
1975 *versus* 1989	0.26**	0.27**	0.22**	0.19*	0.34**	0.18*	0.13	0.26**

Source: UNIDO.

Table 8

Spearman correlation coefficients between MERCOSUR member country intra-industry trade indices, 1989
(Grubel and Lloyd indices at four-digit level of aggregation)

	All	MS	LAIA	EEC	USA	Other
Argentina						
All	1.00					
MERCOSUR	0.32**	1.00				
LAIA	0.21**	0.32**	1.00			
EEC	0.32**	0.28**	0.14*	1.00		
USA	0.41**	0.30**	0.21**	0.41**	1.00	
Other	0.56**	0.21**	0.15*	0.28**	0.33**	1.00
Brazil						
All	1.00					
MERCOSUR	0.29**	1.00				
LAIA	0.20**	0.27**	1.00			
EEC	0.51**	0.22**	0.14*	1.00		
USA	0.46**	0.26**	0.19**	0.43**	1.00	
Other	0.61**	0.33**	0.24**	0.39**	0.39**	1.00
Paraguay						
All	1.00					
MERCOSUR	0.80**	1.00				
LAIA	0.56**	0.27*	1.00			
EEC	0.58**	0.62**	0.15	1.00		
USA	0.45**	0.55**	0.25*	0.73**	1.00	
Other	0.60**	0.73**	0.40**	0.75**	0.73**	1.00
Uruguay						
All	1.00					
MERCOSUR	0.80**	1.00				
LAIA	0.40**	0.37**	1.00			
EEC	0.20*	0.19*	0.25**	1.00		
USA	0.19*	0.15	0.23*	0.36**	1.00	
Other	0.57**	0.39**	0.39**	0.38**	0.32**	1.00

Source: UNIDO.

6.2 Analysis by product groups

Some analytical approaches to intra-industry trade focus on the technological characteristics of the industries. The assumption is that intra-industry trade tends to increase in those branches in which technological innovation plays a vital role in maintaining competitiveness in the international market. According to this view, investment in new technology promotes the horizontal differentiation of products by increasing the range of attributes of particular products, thus generating new varieties of those products. Investment in technology also strengthens vertical differentiation by making it possible to introduce superior qualities in a particular product, whether in terms of its final use or its use in production. Table 9 illustrates this aspect in the case of the MERCOSUR countries.

The intra-industry trade indices that appear in that table refer to trade flows within MERCOSUR. These indices have been calculated for four-digit product groups on the basis of data for the period 1975-1990. In order to ensure that the products listed are truly representative of the phenomenon under examination, consideration was given only to those whose trade represented over one million dollars and indices above 50 per cent in nine or more years of the reporting period. Each of the groups so selected is classified in the columns labelled FI (Factor Intensity) in accordance with the intensity of input production factors. Three categories are considered, depending on whether the product is intensive in human capital and technology, in unskilled labour, or in natural resources. Readers interested in seeing how this classification and the SITC agree are referred to the appendix.

All the 17 products selected in the case of Argentina were found to be intensive in human capital and technology (HC/T). The proportions for Brazil are 20 out of 21, and for Uruguay 11 out of 13. No product group that meets the aforementioned criteria was found for Paraguay. In the three countries, the products with the highest intra-industry trade indices (above 80 per cent) belong to the HC/T category. For Argentina, these product groups are the following: plastics articles (8930), pumping equipment and centrifuges (7192), tools (6952) and machinery parts and accessories (7199); in the case of Brazil, photographic equipment (8624), various electrical apparatus (7299), again machinery parts and accessories, gluten and other products (5995), paints (5333) and compounds of inorganic acids (5142); in the case of Uruguay, automotive spare parts (7328) and organic acids (5125).

In general terms, this predominance of products classified as intensive in human capital and technology reaffirms the importance to intra-industry trade of economies of scale and the differentiation processes brought about by technological change. The fact, however, that these products fall under the heading of intermediates and capital goods makes it necessary to subject them to a more careful analysis.

The sources of intra-industry trade in intermediate products and capital goods are generally different from those of consumer goods. The 14 industries producing intermediate that in 1985 recorded indices above 50 per cent in Argentina/Brazil trade belong to the HC/T category (Behar, 1991). Of these 14 industries, six represent possible cases of product differentiation (vertical or horizontal). In another six cases, however, vertical specialization, i.e., the international fragmentation of the production process, is seen as a relevant explanatory factor. In the case of capital goods, what is found is that intra-industry trade between Argentina and Brazil is associated with the technological differences between the two countries, the dominant trend being Brazilian specialization in the most advanced variety of the same product (ibid.).

In certain industries that produce finished goods, such as paints (5333), detergents (5542) and electrical household appliances (7250), there is a greater likelihood that the high intra-industry trade indices reflect genuine cases of horizontal differentiation (consumer preferences and use characteristics). It should be noted, however, that the indices in the table refer to multilateral trade flows. These indices may not be reliable in the case of bilateral flows, as demonstrated in the aforementioned study using the table reproduced in section 3.

Table 9

Products having high intra-industry trade indices in trade within MERCOSUR, 1975-1990[a]
(Millions of current dollars and unadjusted FL indices)

Argentina					Brazil					Uruguay				
SITC	II	TT	FI	OBS	SITC	II	TT	FI	OBS	SITC	II	TT	FI	OBS
8930	89.26	4.5	HC/T	11	8624	82.23	15.3	HC/T	13	7328	87.23	8.7	HC/T	12
7192	83.88	21.1	HC/T	13	7299	81.57	5.6	HC/T	14	5125	83.49	3.4	HC/T	12
6952	81.54	5.5	HC/T	14	7199	81.45	11.6	HC/T	12	7199	79.86	2.6	HC/T	11
7199	80.74	13.1	HC/T	14	5995	81.34	3.0	HC/T	8	5142	79.38	2.4	HC/T	12
7115	79.95	21.6	HC/T	9	5333	80.85	6.9	HC/T	9	5811	77.99	8.3	HC/T	12
7143	79.06	9.9	HC/T	12	5142	80.73	3.1	HC/T	9	6535	77.63	3.1	UL	10
8624	77.71	15.2	HC/T	14	7231	77.85	3.3	UL	13	5121	76.50	4.4	HC/T	9
7221	77.23	4.9	HC/T	10	7143	77.24	11.3	HC/T	11	6114	75.19	5.8	NR	11
5995	76.91	3.5	HC/T	9	5310	76.53	2.1	HC/T	9	5813	74.08	2.3	HC/T	12
7328	76.09	66.7	HC/T	15	7328	76.53	50.3	HC/T	12	7231	72.75	4.0	HC/T	12
7299	75.09	6.1	HC/T	15	6554	75.46	3.3	HC/T	9	5812	69.11	1.7	HC/T	11
7196	73.75	6.3	HC/T	9	7192	74.66	21.7	HC/T	13	8930	68.98	3.2	HC/T	12
8619	69.94	3.1	HC/T	11	7250	74.54	12.4	HC/T	12	6770	66.95	1.9	HC/T	9
7193	69.53	3.8	HC/T	10	7196	73.65	7.6	HC/T	9					
6999	69.41	8.9	HC/T	11	8921	73.37	2.8	HC/T	10					
7222	68.57	6.6	HC/T	14	8619	73.08	2.9	HC/T	11					
8921	65.69	5.8	HC/T	9	6952	72.92	5.4	HC/T	12					
					5125	72.49	12.1	HC/T	12					
					5999	70.74	9.9	HC/T	10					
					6291	68.86	28.7	HC/T	9					
					5542	65.96	6.2	HC/T	9					

Source: UNIDO.

Notes: II = intra-industry trade index; TT = total trade value; FI = factor intensity; OBS = number of observations; HC/T = human capital and technology; UL = unskilled labour; NR = natural resources.

[a] Averages calculated for product groups representing more than one million dollars in trade and indices of over 50% in nine or more years during the period 1975-1990 (for Brazil, eight years, 1975-1989).

6.3 Vertical differentiation versus horizontal differentiation

As already stated, the problems of aggregation by categories in measuring intra-industry trade cannot be avoided when working, as in this report, with four-digit product groups. One way of overcoming this limitation would be to use data broken down even further, which would better identify horizontally differentiated products. The availability of such data sets a precise limit to empirical efforts of this kind. In the present case, this limit is the five-digit aggregation of the Standard International Trade Classification (SITC). With this degree of aggregation, the analysis is able to distinguish between similar products used in different applications, such as tools used in the processing of non-metallic mineral products and those used in woodworking. Even so, the value differences between exports and imports due either to different transport costs or differences in the quality of the products marketed can skew the measurement of intra-industry trade and confuse cases of horizontal differentiation (HD) with those of vertical differentiation (VD). In order to avoid this kind of problem, a set of criteria and definitions is established here that, when applied to five-digit product groups, makes it possible to more closely approximate the various forms in which trading among the MERCOSUR countries actually occurs. These criteria and definitions lead to a trade classification into the categories defined in table 10. In addition, in the category referred to as "Two-way horizontal", a distinction is also drawn between cases of bilateral and multilateral flows.

Table 10

Definition of categories used in classification of trade flows

One-way	Five-digit groups for which the export (or import) value is less than 10 per cent of the import (or export) value.
Two-way vertical	Five-digit groups for which there is a significant level of exports and imports but for which the difference between the unit value of exports and imports is greater than 15 per cent.
Two-way horizontal	Five-digit groups for which there is a significant level of exports and imports of equivalent-quality products (unit value differences less than 15 per cent).

Table 11 sets out the results obtained when overall and intraregional trade by the MERCOSUR countries is classified according to the above categories. These results can be compared with the GL indices given in table 6. Both in the case of overall trade and in the case of intraregional trade, the percentages corresponding to two-way trade (HD+VD) are generally higher than the GL indices. It should be noted, however, that much of this two-way trade concerns products of different quality (VD). With the sole exception of the percentages for Uruguay at the beginning of the period, the proportion of this type of trade in the total is far higher than the proportion for trade in horizontally differentiated products. The share of HD products in intra-MERCOSUR trade ranges from 7 to 26 per cent for Argentina, from 5 to 9 per cent for Brazil, and from 6 to 17 per cent for Uruguay.

These low percentages for trade in HD products, combined with the predominance of capital goods and intermediates, suggest that **consumer preferences have little effect on the generation of intra-industry MERCOSUR trade**. Comparison of these percentages with those calculated for countries like France, where it can be assumed that demand plays an important part in generating intra-industry trade, confirms what has been said. In the French case it has in fact been found that the proportion of trade in HD products in total trade with the other EEC members is as high as 46 per cent, exceeding by more than 10 percentage points the share of trade in vertically differentiated products (Abd-el Rahman, 1991).

Table 11

Percentage distribution of total trade in manufactures by type of trade
(SITC 5-8, calculated at five-digit level of aggregation)

	Total trade					Intra-MERCOSUR trade				
			Two-way horizontal					Two-way horizontal		
	One-way	Two-way vertical	Total	Bilateral	Multilateral	One-way	Two-way vertical	Total	Bilateral	Multilateral
1975										
Argentina	72.88	21.75	5.36	3.68	1.68	52.58	40.23	7.19	3.12	4.07
Brazil	74.90	23.50	1.61	0.91	0.70	65.25	27.29	7.45	6.03	1.42
Paraguay	98.21	1.67	0.12	0.07	0.06	99.63	0.37	0.00	0.00	0.00
Uruguay	85.57	4.63	9.80	7.95	1.85	80.45	6.34	13.21	8.46	4.75
1980										
Argentina	67.96	25.86	6.19	3.51	2.67	48.08	43.50	8.42	1.52	6.89
Brazil	51.74	44.75	3.51	1.48	2.03	74.53	20.04	5.43	3.03	2.41
Paraguay	99.00	0.97	0.03	0.00	0.03	99.02	0.92	0.06	0.04	0.02
Uruguay[a]	77.06	n.a.	n.a.	n.a.	n.a.	69.48	n.a.	n.a.	n.a.	n.a.
1985										
Argentina	56.22	35.31	8.47	3.71	4.76	44.88	45.24	9.87	1.57	8.31
Brazil	50.40	45.13	4.46	2.99	1.47	68.02	26.78	5.20	1.11	4.10
Paraguay	99.87	0.07	0.06	0.06	0.00	99.99	0.01	0.00	0.00	0.00
Uruguay	71.37	13.72	14.92	7.77	7.15	65.10	18.01	16.90	4.98	11.92
1990										
Argentina	37.12	54.54	8.34	6.49	1.85	36.79	37.49	25.72	19.27	6.45
Brazil[b]	43.70	55.19	1.11	1.03	0.09	35.67	55.01	9.32	4.32	5.00
Paraguay	95.47	4.52	0.01	0.00	0.01	95.41	4.04	0.55	0.00	0.55
Uruguay	66.41	26.01	7.58	5.77	1.81	59.21	34.76	6.03	1.81	4.22

Source: UNIDO.

[a] Import data not available for this year.
[b] 1989.

A trend towards increasing trade in vertically differentiated products is very marked in the case of Uruguay. Between 1975 and 1989, this share rose from 5 to 26 per cent in the case of overall trade and from 6 to 35 per cent in the case of trade within MERCOSUR. With allowance made for some variations, the same trend is also found in the case of Brazil, where the increases are in the order of 32 and 28 percentage points, respectively.

The data given in table 12 regarding the distribution by trading partner of bilateral intra-MERCOSUR trade in horizontally differentiated products complement the information furnished in table 11. The most conspicuous phenomenon reflected in this table is the increasing importance of Brazil in Uruguayan trade in HD products. In 1975, trade with Brazil represented scarcely 10 per cent of Uruguay's trade in horizontally differentiated products with the region. Beginning that year, Brazil's share doubled every five years, until it reached the figure of 95 per cent in 1990. Conversely, Argentina became progressively less important as a trading partner for Uruguay in this type of trade.

Table 12

Percentage distribution of bilateral intra-MERCOSUR trade by trading partner
(SITC 5-8, calculated at five-digit level of aggregation)

	Argentina	Brazil	Paraguay	Uruguay
1975				
Argentina	0.00	99.45	0.00	0.55
Brazil	99.54	0.00	0.17	0.28
Paraguay	0.00	0.00	0.00	0.00
Uruguay	90.34	9.66	0.00	0.00
1980				
Argentina	0.00	83.15	0.00	16.85
Brazil	95.20	0.00	0.00	4.80
Paraguay	100.00	0.00	0.00	0.00
Uruguay[a]	n.a.	n.a.	n.a.	n.a.
1985				
Argentina	0.00	63.23	0.00	36.77
Brazil	95.53	0.00	0.00	4.47
Paraguay	0.00	0.00	0.00	.
Uruguay	58.46	41.54	0.00	0.00
1990				
Argentina	0.00	98.60	0.05	1.35
Brazil[b]	60.57	0.00	2.19	37.24
Paraguay	0.00	0.00	0.00	.
Uruguay	4.59	95.30	0.10	0.00

Source: UNIDO.

[a] Import data not available for this year.

[b] 1989.

7. EFFECTS OF REGIONAL INTEGRATION

The timetable established under the Treaty of Asunción for the reciprocal removal of customs duties calls for the abolition of intra-MERCOSUR tariff barriers by 1996. In addition, the agreement provides for the elimination of the many administrative requirements and State regulations that impede the free circulation of goods between the member countries. Taken together, these liberalizing measures should stimulate intraregional trade and production efficiency, resulting in greater benefits for the consumers and for business. Nevertheless, these benefits will depend, in the final analysis, on the costs of the industrial adjustment that the creation of the common market will inevitably entail. As indicated in the introduction, these costs can be lowered if the adjustment just referred to takes place against the background of increasing specialization and intra-industry trade. That depends, among other things, on previous levels of industrial protectionism, on whether or not there are untapped economies of scale, and on the characteristics of demand.

In this section, these aspects will be considered by referring to the results of industrial simulations based on a partial equilibrium model that assumes decreasing cost functions and product differentiation. The model was calibrated using production, trade, and tariff level data for the year 1985 as well as parameters reflecting supply and demand. Five trading partners – Argentina, Brazil, Uruguay, the rest of the Latin American Integration Association (LAIA) and the rest of the world – were considered for purposes of the calibration. Paraguay was included under the rest of LAIA because of the lack of sufficiently disaggregated production data for that country.

The simulations contemplate two scenarios: in one, reciprocal tariffs are lowered to 50 per cent of the 1985 levels; in the other, there is a 100-per-cent tariff reduction. These scenarios correspond approximately to the situations expected for 1994 and 1996. In keeping with the spirit of the LAIA agreements concerning the gradual liberalization of regional trade, consideration has also been given to increases in the tariff preferences applied during the base year in trade between the MERCOSUR countries and the other LAIA countries. It is important to point out that because of problems concerning the availability of production data and difficulties in reconciling those data with the trade figures, it was necessary to limit the number of industries selected to the seven that appear in the tables mentioned. For the same reasons, it was necessary to work with data aggregated at the four-digit level of the International Standard Industrial Classification (ISIC).[3] For a more detailed discussion of the results of the simulations in terms of production level variations, market structure, and benefits to the consumer, Government and business, the reader is referred to the work by J. Behar (Behar, 1993). The subsequent discussion concerns the results for the trade flows, in particular the changes that occur in the intensity of intra-industry trade.

Table 13 illustrates a number of characteristics of the industries selected in the base year. The data contained in the column entitled "Number of firms" include only those firms with a similar size distribution. The Herfindal index in the fourth column indicates the degree of market concentration, taking into account not only the sales of local companies but also those of foreign firms. The higher the index, the greater the existing concentration and, accordingly, the lower the level of competition. The last three columns describe the structure according to the destination of the total trade in each industry. As is evident, these structures differ widely one from the other. For example, in the electrical household appliance industry (3833) the average share of intra-MERCOSUR trade in the total for the three countries exceeds 40 per cent, whereas in the case of the pharmaceuticals industry (3522) this share does not even average 9 per cent.

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[3] The industries selected do not correspond exactly to the ISIC four-digit categories. In certain cases – artificial fibres, for example – the industry is actually a five-digit sub-industry classified under the corresponding four-digit category. In other cases - electrical household appliances, for example – the industry indicated is an aggregation of two five-digit sub-industries classified in different four-digit categories. The production values have been calculated in dollars adjusted for parity changes around the year 1985.

Table 14 presents a comparison of the intra-industry trade indices based on the simulations with those for the pre-integration period.[4] To facilitate the analysis of the table, the type of specialization prevalent in an industry is defined as predominantly intra-industrial (intra) or predominantly interindustrial (inter), according to whether the corresponding GL index is greater than 50 per cent or not. Examination of the table suggests the following conclusions.

Table 13

Some characteristics of the industries selected,[a] 1985

Country and ISIC	Production	No of firms	Herfindal index	Total trade	Percentage of total trade		
					MERCOSUR	LAIA	Other
Argentina							
3513	280.00	11.00	0.07	68.77	16.89	30.76	52.35
3522	1 253.93	48.00	0.09	113.42	6.24	7.06	86.69
3691	178.65	48.00	0.02	18.91	11.28	1.21	87.51
3825	164.43	5.00	0.03	265.69	6.45	7.59	85.95
3831	200.00	35.00	0.03	84.79	8.51	4.04	87.45
3833	358.00	12.00	0.24	11.21	52.28	8.51	39.21
3843	3 155.00	5.00	0.18	292.69	25.40	13.12	61.48
Brazil							
3513	1 884.00	17.00	0.05	202.51	5.28	10.16	84.56
3522	3 072.37	68.00	0.07	170.11	3.66	8.76	87.58
3691	1 557.88	28.00	0.04	53.43	4.80	20.11	75.09
3825	2 481.97	43.00	0.04	431.96	4.10	7.00	88.90
3831	3 151.83	73.00	0.02	380.93	3.31	6.74	89.94
3833	1 871.40	18.00	0.17	41.76	10.63	16.25	73.12
3843	16 300.00	7.00	0.14	1 477.44	5.77	15.46	78.77
Uruguay							
3513	32.00	4.00	0.13	17.37	66.01	2.29	31.70
3522	116.59	25.00	0.15	20.77	14.44	5.09	80.48
3691	5.38	10.00	0.06	3.92	39.13	3.42	57.45
3825	2.58	11.00	0.01	8.36	16.67	4.00	79.33
3831	8.91	24.00	0.01	13.09	74.42	0.87	24.70
3833	30.00	6.00	0.39	5.80	58.18	0.72	40.80
3843	71.31	4.00	0.13	30.18	77.98	0.16	21.86

Source: Behar (1993)

[a] Production and trade values in millions of current dollars.

[4] The basic indices given in the table are the result of the calibration of the model. These indices are approximations of the indices that were observed in 1985 and that appear in table A8.

Table 14

Effects of regional integration on the level of intra-industry trade

Bilateral trade	Artificial fibres 3513		Pharmaceutical products 3522		Clay products 3691		Office machinery 3825		Electrical machinery 3831		Electrical house-hold appl. 3833		Motor vehicles and parts 3843	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
	Scenario 1: 50% reduction in intra-MERCOSUR tariffs and 50% increase in LAIA preference margins													
A-B	32.05	58.69	3.94	5.39	3.31	6.08	7.04	18.67	95.21	71.48	58.19	25.52	88.88	53.95
A-U	48.14	51.80	6.90	6.45	44.51	68.51	10.71	9.59	21.88	15.72	16.35	44.02	64.60	37.48
B-U	97.10	82.14	14.02	17.32	76.38	90.15	1.93	11.03	65.48	57.49	4.13	5.16	0.24	0.29
A-MS	39.64	57.08	57.09	61.41	13.05	16.90	11.87	23.83	73.87	59.87	96.21	47.23	87.02	53.25
B-MS	63.70	74.21	5.76	7.73	35.12	45.92	6.75	18.15	82.29	98.23	89.88	61.81	89.08	73.24
U-MS	71.38	68.09	9.46	10.41	99.05	97.95	4.66	10.60	55.24	46.58	78.04	68.89	16.36	8.64
	Scenario 2: 100% reduction in intra-MERCOSUR tariffs and 100% increase in LAIA preference margins													
A-B	32.05	89.25	3.94	7.05	3.31	9.34	7.04	39.79	95.21	54.35	58.19	10.71	88.88	32.87
A-U	48.14	57.81	6.90	6.07	44.51	61.77	10.71	9.59	21.88	12.42	16.35	88.98	64.60	20.65
B-U	97.10	67.05	14.02	20.67	76.38	66.99	1.93	32.76	65.48	54.14	4.13	6.50	0.24	0.33
A-MS	39.64	85.93	57.09	65.46	13.05	16.57	11.87	44.35	73.87	48.47	96.21	17.48	87.02	32.59
B-MS	63.70	96.00	5.76	9.91	35.12	71.80	6.75	39.26	82.29	81.09	89.88	38.02	89.08	45.18
U-MS	71.38	63.42	9.46	11.47	99.05	66.28	4.66	26.40	55.24	42.33	78.04	37.00	16.36	4.88

Source: Behar (1993).

Notes: A = Argentina; B = Brazil; U = Uruguay; MS = MERCOSUR.
PRE = Model calibration results assuming perfect price competition (Bertrand); base year 1985.
POST = Simulation results assuming constant number of firms.

In the industry group comprising artificial fibres, pharmaceuticals, clay products and office machinery, a 50-per-cent reduction in reciprocal tariffs has the effect of increasing intra-industry trade between Argentina and Brazil. For the remaining three industries, namely electrical machinery, electrical household appliances and motor vehicles, on the other hand, there is a marked decline in the indices. In the case of artificial fibres the index increases from 32 to 59 per cent, reversing the type of specialization from inter to intra. In the case of electrical household appliances, on the other hand, the type of specialization is reversed in the opposite direction, from intra to inter, as the index drops from 58 per cent to 26 per cent.

The total abolition of tariff barriers, reflected in the lower portion of the table, accentuates these trends. This is particularly true in the case of motor vehicles, for which the index falls to below 33 per cent, indicating a lower level of intra-industry specialization with the liberalization of trade between the two countries. It should be pointed out, however, that this observation assumes the free play of market forces, a fairly questionable hypothesis in this case, given the importance of sectoral agreements and of intra-firm trading in the MERCOSUR automotive industry.[5] Attention is also invited to the considerable increase forecast for the GL index in the office machinery industry once the free trade zone has been fully established. According to the results of the simulations, the growth in intra-industry trade is linked to a greater penetration by Argentine companies of the Brazilian market. The increase in the share of that market held by Argentine companies is equivalent, in percentage terms, to the losses they experience in their home market, mainly to Brazilian producers. Owing, however, to the larger size of the Brazilian market, the volume of Argentine exports to Brazil considerably outweighs the volume of imports. This positive performance by Argentine business is explained by the higher pre-integration level of protectionism in Brazil and the fact that the cost differentials associated with company size are not so pronounced in the office machinery industry. An opposite example is provided by the artificial fibre industry, where not only are the pre- integration tariff differences smaller but the Brazilian companies are on average much larger than their Argentine competitors. As a consequence, there is significant increase in the Brazilian companies' share of the Argentine and Uruguayan import markets, but not at the expense of severe losses by these companies in their own domestic market.

The indices for Uruguay's bilateral trade flows with its two partners are found in the row labelled U-MS. It will be seen that the 50-per-cent tariff reduction has less of an effect on the GL indices than in the case of trade between Argentina and Brazil. There is a reversal in the type of specialization only in the case of the electrical machinery industry. The trend is towards interindustry specialization, but it is marginal since the index remains around 50 per cent. In general terms, the total abolition of tariffs does not greatly alter the previous industrial specialization pattern. An exception can be found in the electrical household appliance industry, where the index falls from 59 to 33 per cent. However, if this index is broken down by bilateral trade flows, one finds a marked intensification of intra-industry trade with Argentina.

The Uruguayan case is of particular interest given the small size of that country's domestic market and, consequently, the smaller average size of its enterprises. Owing to these factors, one might expect that the impact on production would be greater and that, accordingly, the extent of the required industrial adjustment would also be greater. This premise is borne out in the four electro-mechanical branches: office machinery, electrical machinery, electrical household appliances and motor vehicles. In these industries the effect of the integration process is to reduce the Uruguayan producers' share of the domestic market, while the increase in their exports is not large enough to compensate totally for these losses. As a consequence, one finds severe

[5] A more general limitation applicable to all the simulations is that they do not take into account non-tariff barriers.

declines in production levels and increases in average costs.[6] These effects are particularly serious in the electrical household appliance industry and the motor vehicle industry. The former provides an instructive example of the changes in industrial specialization that may be caused by the integration process.

As already noted, in this industry there has been a strong increase in Uruguayan intra-industry trade with Argentina. The coexistence of this phenomenon with the decline of production in Uruguay is connected, on the one hand, with the greater interpenetration of the two markets and, on the other, with the fact that the Uruguayan firms are losing major shares of their home market as a consequence of a sharp increase in imports from Brazil. Within the terms of the model, this can be interpreted as a process in which the Uruguayan firms are specializing in particular varieties that are competitive in the Argentine market, while the varieties offered in the domestic market are being pushed out by Brazilian and, to a lesser extent, Argentine equivalents that are of better quality or lower priced.

8. CONCLUSIONS

The conclusions of this study may be summarized as follows:

- In the last 15 years, intraregional trade in manufactured goods among the MERCOSUR member countries has increased considerably. In general, this growth exceeds that recorded in the other trade flows, which suggests that there has been a greater interpenetration of local markets. This trend started before the entry into force of the Asunción quadripartite agreement and represents a factor that is conducive to the embryonic integration process.

- The persistence of severe imbalances in manufactures trade between Argentina and Brazil, imbalances that are favourable to the latter, may impede the achievement of a free trade zone. Bilateral trade between these two countries constitutes the principal integration axis within MERCOSUR. Accordingly, imbalances in this trade have serious consequences for the future of the overall integration project. Against this background, there is an urgent need for greater coordination of exchange rate and monetary policy and for the dismantling of tariff-related barriers and convergence towards a common tariff. This would provide a better framework for the trade liberalization process by reducing the distortions in relative prices and by so facilitating an increase in competitiveness and in intra-industry specialization.

- The prospects for this kind of specialization have been assessed in this report on the basis of a retrospective analysis of intra-industry trade. The first general finding of this analysis was that most intraregional trade is concentrated in intermediates and in capital goods. Secondly, it was found that the ranking of industries according to the level of intra-industry trading is not greatly affected by changes in the measuring method.

- By comparing intra-industry trade indices according to country type and trading partner it has been possible to check the results against a number of hypotheses that have been advanced in the technical literature. First, it was found that, as maintained by various writers, the two largest economies displayed the highest intra-industry trade indices for trade flows both within and outside MERCOSUR. Second, it was demonstrated that in 1990 there was a sharp increase in the bilateral trade index between Argentina and Brazil, with this index rising to nearly the level found in trade among developed countries. Given that the process of mutual tariff reduction between Argentina and Brazil preceded the MERCOSUR process by several years, this observation is in line with the hypothesis that integration agreements act as a spur to intra-industry trade. This view is also

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[6] Because of the theory of economies of scale.

strengthened when one considers Argentine and Uruguayan trade with their Latin American Integration Association partners (LAIA). The data for Uruguay confirm the notion of a high intra-industry content in intra-regional trade. In fact, the indices for that country were higher than those for trade among developing countries having a level of industrialization similar to Uruguay's. On the other hand, the clearly interindustry character of Paraguayan trade confirms the theory that this type of trade is linked to lower levels of income and economic development.

- The analysis of intra-industry trade trends indicated that, in the case of Argentina and Uruguay, the greater intensity of this trade within the region was a constant for the period in question. It was also found that the direction of the trade alters the pattern of trade by industry, since there are many cases of simultaneous intra- and inter-industry specialization, depending on the trade flow in question. Finally, it was established that the increase in intra-industry trade in the MERCOSUR context is associated with the emergence of new specialization processes.

- The disaggregated analysis showed that in the case of intra-industry trade within MERCOSUR the leading product groups are those that are technology-intensive and rely heavily on human capital. This accords with the theories that link intra-industry trade to product differentiation resulting from technological innovation processes and the existence of economies of scale. However, the findings of other studies indicate that the high intra-industry component observed in the trading in these products requires more precise explanation, since what are involved are intermediate products and capital goods. The fragmentation of the production process and the technological differences among the MERCOSUR countries may be cited as useful explanations in this regard.

- The question of the predominant type of product differentiation led to an investigation into trade flows at the highest level of disaggregation possible. The results of this analysis confirmed the importance of intra-industry trade to the MERCOSUR countries, while at the same time indicating that a high proportion of that trade is accounted for by trading in vertically differentiated products, i.e., products differentiated according to quality. The low percentages of trade in horizontally differentiated products and the low proportion of consumer goods in intraregional trade suggest that, contrary to the situation observed in the industrialized countries, demand-side factors still play a minor role in the MERCOSUR intra-industry specialization process.

- Using a simulation model that takes into account economies of scale and similar varieties of the same product, it can be shown that integration has differential effects on the intensity of intra-industry trade at the subsectoral level. The magnitude and direction of these effects depend on the economies of scale at the production stage, the degree of tariff protection, and the relative size of pre-existing plant and equipment. For the enlarged market, integration heightens the degree of intra-industry specialization in four of the industries considered, and lowers it in the other three. In bilateral trading, however, it is found that, although integration does lead to a lower share of the local market, it offers new opportunities for specialization through the penetration of the associated markets.

METHODOLOGICAL APPENDIX

Growth rates

The growth rates for total intra-MERCOSUR trade have been calculated as the difference between unity and the antilogarithm of the coefficient b, estimated by the linear regression:

$$c_t = a + b_t + e_r$$

This equation is a logarithmic transformation of the formula used to obtain the compound growth rate:

$$C_t = C_0(1+r)^t,$$

where C_0 is the value of total trade in the initial year (1975) and r is the growth rate.

Intra-industry trade coefficients

The variables used in calculating the intra-industry trade indices are the following:

i = Industry or product group
j = Reporting country
k = Trading partner
X = Exports
M = Imports

Grubel and Lloyd (GB)

By industry, country and trading partner:

$$GB_{ijk} = 100\frac{(X_{ijk} + M_{ijk}) - |X_{ijk} - M_{ijk}|}{(X_{ijk} + M_{ijk})}$$

By industry, country and trading partner groupings:

$$GB_{ij}^{k} = 100\frac{(\sum_k X_{ijk} + \sum_k M_{ijk}) - |\sum_k X_{ijk} - \sum_k M_{ijk}|}{(\sum_k X_{ijk} + \sum_k M_{ijk})}$$

By groups of industries, countries and/or trading partners:

$$GB_{ijk}^{ijk} = 100\frac{(\sum_i\sum_j\sum_k X_{ijk} + \sum_i\sum_j\sum_k M_{ijk}) - \sum_i\sum_j|\sum_k X_{ijk} - \sum_k M_{ijk}|}{\sum_i\sum_j\sum_k (X_{ijk} + M_{ijk})}$$

Aquino (AQ)

The Aquino adjustment for the case of bilateral trade flows in a particular industry is the following:

$$AQ_{ijk} = 100\frac{(X'_{ijk} + M'_{ijk}) - IX'_{ijk} - M'_{ijk}I}{(X'_{ijk} + M'_{ijk})}$$

where

$$X'_{ijk} = X_{ijk}\frac{(\sum_i X_{ijk} + \sum_i M_{ijk})}{\sum_i X_{ijk}}$$

$$M'_{ijk} = M_{ijk}\frac{(\sum_i X_{ijk} + \sum_i M_{ijk})}{\sum_i M_{ijk}}$$

As in the case of the GL index, the AQ indices may be aggregated for a group of industries, countries or trading partners. The formula for aggregation by industries is the following:

$$AQ^i_{ijk} = 100\frac{(\sum_i X_{ijk} + \sum_i M_{ijk}) - I\sum_i X'_{ijk} - \sum_i M'_{ijk}I}{\sum_i (X_{ijk} + M_{ijk})}$$

It should be noted that

$$\sum_i (X'_{ijk} + M'_{ijk}) = \sum_i (X_{ijk} + M_{ijk})$$

STATISTICAL APPENDIX

Table A1

Intra-MERCOSUR exports of manufactures
(Five-year averages in millions of current dollars)

Origin	Destination			
	Argentina	Brazil	Paraguay	Uruguay
1975-1979				
Argentina	0.00	132.92	64.59	82.03
Brazil	197.88	0.00	169.77	77.74
Paraguay	3.70	7.94	0.00	0.25
Uruguay	37.32	36.32	4.07	0.00
1980-1984				
Argentina	0.00	148.51	64.25	84.35
Brazil	403.31	0.00	280.94	247.46
Paraguay	8.35	6.82	0.00	0.16
Uruguay	78.35	36.75	6.88	0.00
1985-1989				
Argentina	0.00	287.00	33.33	121.96
Brazil	569.70	0.00	294.36	156.55
Paraguay	2.37	9.14	0.00	0.50
Uruguay	71.43	108.91	4.00	0.00

Source: UNIDO.

Table A2

Intra-MERCOSUR imports of manufactures
(Five-year averages in millions of current dollars)

Origin	Destination			
	Argentina	Brazil	Paraguay	Uruguay
1975-1979				
Argentina	0.00	177.30	3.64	33.16
Brazil	144.51	0.00	10.14	37.51
Paraguay	30.24	54.19	0.00	3.36
Uruguay	68.91	69.26	0.60	0.00
1980-1984				
Argentina	0.00	546.56	4.42	86.91
Brazil	160.75	0.00	16.74	39.66
Paraguay	37.57	129.86	0.00	5.74
Uruguay	77.71	139.10	0.33	0.00
1985-1989				
Argentina	0.00	531.99	2.30	79.26
Brazil	313.76	0.00	[illegible]	162.62
Paraguay	22.42	136.86	[illegible]0	4.12
Uruguay	105.16	202.59	[illegible].43	0.00

Source: UNIDO.

Table A3

Intra-MERCOSUR exports by SITC divisions
(Percentage share of member countries in the total. Selected years)

SITC code	Argentina			Brazil			Paraguay			Uruguay		
	1980	1985	1990	1980	1985	1990	1980	1985	1990	1980	1985	1990
51	5.49	56.80	31.26	50.88	29.92	42.64	3.08	3.38	10.56	10.55	9.91	15.54
52	4.92	66.15	80.76	0.00	0.00	0.00	35.50	0.00	8.94	59.59	33.85	10.30
53	18.94	27.07	12.95	33.39	41.84	63.34	31.38	17.68	8.07	16.39	13.42	15.64
54	16.51	50.09	20.44	14.68	0.86	9.17	48.91	21.16	28.05	19.91	27.89	42.34
55	27.60	28.82	13.09	16.85	14.11	54.32	49.08	46.93	20.62	6.46	10.15	11.97
56	35.10	10.36	3.86	30.96	3.19	28.65	28.91	62.25	45.71	5.03	24.20	21.78
57	27.20	2.59	4.06	0.00	0.00	3.28	64.96	79.77	74.80	7.84	17.64	17.87
58	60.98	46.02	10.08	6.30	16.00	39.80	7.37	8.09	9.17	25.36	29.90	40.95
59	58.81	69.26	21.31	18.07	6.72	40.15	9.05	7.76	24.59	14.06	16.26	13.96
61	2.77	0.12	0.43	45.60	91.03	66.43	4.80	0.08	0.16	46.84	8.76	32.98
62	38.01	28.71	5.21	23.82	9.54	40.97	32.79	56.44	47.17	5.38	5.32	6.65
63	54.64	33.54	6.07	29.37	32.64	77.71	3.08	18.38	2.82	12.90	15.44	13.40
64	73.61	51.09	21.40	0.20	4.70	49.79	18.19	20.30	12.23	8.00	23.92	16.58
65	44.07	24.22	8.21	8.16	9.35	51.10	38.78	52.85	26.83	9.00	13.58	13.86
66	49.65	17.13	11.16	10.90	2.82	41.79	35.20	68.80	36.00	4.24	11.25	11.05
67	51.71	61.94	33.78	7.74	0.95	11.17	16.27	17.93	17.95	24.28	19.18	37.10
68	47.19	67.86	20.31	0.01	8.35	17.77	6.77	6.54	4.65	46.03	17.26	57.27
69	41.25	22.56	9.81	4.14	4.20	21.52	35.37	50.25	51.53	19.24	22.98	17.14
71	51.11	42.89	17.46	11.08	7.12	44.96	19.82	36.27	13.18	17.99	13.72	24.41
72	49.28	44.16	18.34	10.87	9.94	13.68	22.93	22.79	38.20	16.93	23.12	29.78
73	31.43	32.27	13.52	7.13	29.28	38.13	21.58	14.00	13.96	39.86	24.45	34.39
81	67.39	7.61	4.46	0.05	0.68	21.12	30.18	82.19	58.31	2.39	9.53	16.11
82	20.57	4.60	8.04	1.87	0.00	45.87	70.59	89.16	13.11	6.97	6.24	32.97
83	14.51	45.93	9.70	0.00	0.00	74.42	82.95	51.85	13.56	2.54	2.22	2.32
84	32.66	22.76	8.05	0.79	3.76	70.55	64.13	68.19	17.24	2.41	5.29	4.16
85	33.61	3.87	1.36	4.52	3.46	19.06	53.16	86.74	59.51	8.71	5.93	20.07
86	41.71	46.69	13.84	29.99	36.17	53.43	17.42	9.23	12.14	10.88	7.92	20.59
89	48.27	35.36	16.78	4.72	2.81	30.95	30.70	42.43	28.87	16.31	19.39	23.39

Source: UNIDO.

Table A4

MERCOSUR intra-industry trade indices by trading partner
(SITC 5-8, calculated at three-digit level of aggregation using the Aquino adjustment)

Trade flow		REPORTING COUNTRY				
		Argentina	Brazil*	Paraguay	Uruguay	MERCOSUR*
Intra-MERCOSUR						
Argentina	1975	-	-	-	-	-
	1980	-	-	-	-	-
	1985	-	-	-	-	-
	1990	-	-	-	-	-
Brazil	1975	37.12	-	-	-	-
	1980	44.40	-	-	-	-
	1985	39.60	-	-	-	-
	1990	60.24	-	-	-	-
Paraguay	1975	2.93	21.44	-	-	-
	1980	17.71	1.24	-	-	-
	1985	15.91	0.45	-	-	-
	1990	12.67	5.46	-	-	-
Uruguay	1975	33.96	13.08	0.00	-	-
	1980	37.41	23.95	0.60	-	-
	1985	42.93	38.00	0.00	-	-
	1990	40.85	26.59	9.90	-	-
MERCOSUR	1975	44.19	42.15	0.69	29.02	-
	1980	56.19	45.63	2.21	39.61	-
	1985	52.10	42.56	1.36	52.32	-
	1990	63.27	53.97	7.47	47.14	-
Extra-MERCOSUR						
LAIA	1975	17.30	22.36	1.43	10.21	23.72
	1980	33.81	19.80	0.93	8.04	26.99
	1985	37.78	27.70	0.80	10.81	36.00
	1990	40.53	22.32	5.31	19.30	30.81
EEC	1975	32.12	27.27	0.89	4.64	31.48
	1980	29.29	31.62	0.98	5.14	38.37
	1985	27.86	47.46	1.72	11.33	50.29
	1990	40.78	39.95	1.77	11.49	41.68
USA	1975	38.90	27.46	0.01	5.34	30.23
	1980	29.57	34.78	1.04	6.74	44.21
	1985	26.79	35.48	0.76	6.92	36.83
	1990	29.86	41.91	2.65	6.37	41.24
Others	1975	16.95	27.79	0.46	15.30	30.73
	1980	24.73	37.37	1.52	12.76	44.25
	1985	27.08	30.03	0.49	12.92	33.16
	1990	28.77	32.46	2.27	17.98	55.68
All	1975	39.00	42.49	2.00	21.09	46.62
	1980	50.98	46.18	2.79	30.05	59.18
	1985	48.63	47.75	1.48	32.78	52.86
	1990	51.29	48.83	6.06	34.46	52.99

Source: UNIDO.

* 1990 indices based on 1989 data.

Table A5

Spearman correlation coefficients between MERCOSUR intra-industry trade indices
(Aquino indices at three-digit level of aggregation)

	MS-Argentina	MS-Brazil	MS-Paraguay	MS-Uruguay	MS-LAIA	MS-EEC	MS-USA	MS-Other
1989								
MS–Argentina	1.00							
MS–Brazil	0.50**	1.00						
MS–Paraguay	0.26*	0.32*	1.00					
MS–Uruguay	0.39**	0.56**	0.19	1.00				
MS–LAIA	0.26*	0.37**	0.26*	0.35**	1.00			
MS–EEC	0.33**	0.45**	0.11	0.28*	0.18	1.00		
MS–USA	0.17	0.33**	0.08	0.1[illegible]	0.10	0.45**	1.00	
MS–Other	0.18	0.40**	0.10	0.24*	0.32**	0.62**	0.74**	1.00
1975 *versus* 1989	0.40**	0.44**	0.20	0.44**	0.33**	0.12	0.06	0.31**

Source: UNIDO.

Table A6

Spearman correlation coefficients between intra-industry trade indices of MERCOSUR member countries, 1989
(Aquino indices at three-digit level of aggregation)

	All	MS	LAIA	EEC	USA	Other
Argentina						
All	1.00					
MERCOSUR	0.32**	1.00				
LAIA	0.35**	0.29*	1.00			
EEC	0.45**	0.24*	0.36**	1.00		
USA	0.58**	0.28*	0.36**	0.44**	1.00	
Other	0.62**	0.11	0.21	0.28*	0.46**	1.00
Brazil						
All	1.00					
MERCOSUR	0.27*	1.00				
LAIA	0.18	0.37**	1.00			
EEC	0.66**	0.23	0.11	1.00		
USA	0.62**	0.16	0.07	0.51**	1.00	
Other	0.62**	0.36**	0.18	0.40**	0.47**	1.00
Paraguay						
All	1.00					
MERCOSUR	0.79**	1.00				
LAIA	0.51**	0.34*	1.00			
EEC	0.58**	0.27	0.24	1.00		
USA	0.42**	0.41**	0.37*	0.49**	1.00	
Other	0.62**	0.59**	0.51**	0.60**	0.67**	1.00
Uruguay						
All	1.00					
MERCOSUR	0.74**	1.00				
LAIA	0.40**	0.35**	1.00			
EEC	0.15	0.14	0.21	1.00		
USA	0.27*	0.17	0.20	0.49**	1.00	
Other	0.46**	0.27*	0.30*	0.48**	0.52**	1.00

Source: UNIDO.

Table A7

Production classification by factor intensity

5121	Hydrocarbons	HC/T
5125	Organic acids	HC/T
5142	Metallic compounds of inorganic acids	HC/T
5310	Colouring materials	HC/T
5333	Prepared paints	HC/T
5542	Detergents	HC/T
5811	Condensation products	HC/T
5812	Polymerization products	HC/T
5813	Cellulose derivatives	HC/T
5995	Gluten and other products	HC/T
5999	Chemical products n.e.s.	HC/T
6114	Bovine leather	NR
6291	Inner tubes and tyres	HC/T
6535	Wool fabrics	UL
6554	Various textile products	UL
6770	Steel cables	HC/T
6952	Tools	HC/T
7115	Piston engines	HC/T
7143	Calculating machines	HC/T
7192	Pumping machinery and centrifuges	HC/T
7193	Manual mechanical equipment	HC/T
7196	Non-electrical machinery	HC/T
7199	Machinery parts and components	HC/T
7221	Electrical machinery	HC/T
7222	Electrical switches	HC/T
7231	Electrical cables	HC/T
7250	Electrical household appliances	HC/T
7299	Various electrical apparatus	HC/T
7328	Automotive spare parts and accessories	HC/T
8619	Test and measurement instruments	HC/T
8624	Photographic material and equipment	HC/T
8921	Printed books	HC/T
8930	Various plastics articles	HC/T

Table A8

Intra-industry trade indices for Argentina, Brazil and Uruguay by trading partners, 1985
(Selected ISIC industries. Grubel and Lloyd indices)

	ISIC code						
Bilateral trade	3513	3522	3691	3825	3831	3833	3843
Argentina							
Brazil	27.92	3.37	2.65	5.74	96.95	67.11	99.39
Uruguay	46.43	7.17	30.18	11.06	26.42	12.80	76.50
MERCOSUR	37.79	54.88	9.75	10.37	79.97	83.58	98.56
LAIA	54.88	14.56	22.09	97.42	14.57	29.61	59.69
Other	39.38	22.51	8.45	92.45	22.83	39.54	27.94
All	71.64	36.04	10.64	87.92	37.66	73.71	61.35
Brazil							
Argentina	27.92	3.37	2.65	5.74	96.95	67.11	99.39
Uruguay	99.22	12.67	83.10	2.08	72.64	4.06	0.23
LAIA	63.85	4.98	33.45	5.54	82.35	95.72	79.35
MERCOSUR	1.75	61.31	0.17	6.55	5.63	0.27	14.57
Other	90.14	61.82	43.86	98.55	42.69	27.18	25.96
All	79.78	73.43	34.58	90.87	55.41	31.00	27.28
Uruguay							
Argentina	46.43	7.17	30.18	11.06	26.42	12.80	76.50
Brazil	99.22	12.67	83.10	2.08	72.64	4.06	0.23
MERCOSUR	70.72	9.14	85.77	4.88	62.33	66.04	20.68
LAIA	7.05	31.17	13.43	7.18	23.58		
Other	5.16	27.03	0.80	2.05	26.65	1.35	37.86
All	87.13	31.67	34.48	2.73	54.51	79.58	24.54
MERCOSUR							
LAIA	30.24	44.35	0.78	43.87	6.74	4.42	21.08
Other	95.22	44.98	83.70	95.27	39.06	53.77	46.09
All	93.34	56.65	72.96	99.89	52.24	58.00	47.87

Source: Behar (1993).

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