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FDI, Trade and integration in Mercosur¹

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In the 90's, the Mercosur countries experienced a strong growth of trade and foreign direct investment (FDI). To examine the relationship between FDI, trade and regional integration in the Mercosur, we tested different disaggregated gravity equations on trade and FDI flows between two Mercosur members – Argentina and Brazil – and their partners during the 90's. Our results attest a strong relationship between FDI and imports, but a weak and negative linkage between FDI and exports. This reinforces the perception that the investment flows into the Mercosur countries has generated strong flows of imports without generating exports. Another important result is the relevance of Mercosur in multinational firms strategies that seems to be different depending on the country where the firm is located. Firms installed in Brazil give an importance to the regional market while the firms installed in Argentina, assume that regional market is not a relevant issue.

Codes JEL : F1, F2.

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INTRODUCTION

The Latin American countries experienced a strong growth of trade and foreign direct investment (FDI) during the 1990's. The major factors that let this happen are certainly the recovery of economic growth in the region (which is mainly due to macroeconomic stabilisation) and the multilateral and regional trade liberalisation process.

Among the different initiatives of economic integration in Latin America, the Mercosur is the most dynamic. Its major economic result is the intensification of regional trade, which was multiplied by five during the 90's. In addition to that, the trade flows with the other countries have also substantially risen. The main external partners of Mercosur are EU, US and other Latin-American countries. The expansion of trade came together with a strong growth of FDI inflows to the region. The annual inflows average rose from \$ 2 billions in 1990 to \$ 54 billions in 1999. The main investors are the EU countries, notably Spain, and the US.

One can ask if there is a link between the increase of trade and the growth of FDI, in a context of trade liberalisation and regionalization occurred during the past decade. In fact, it would be interesting to know, firstly, if the Multinational enterprises (MNF) strategies in the region were modified by the Mercosur's creation and, secondly, if FDI has a positive impact on imports and exports. These issues are important not only from a micro point of view but also from a macroeconomic one.

The growth of FDI inflows was essential for financing the current balance in Mercosur in the 90's. However, several issues concerning its long term contribution to current and trade balance raised as we noticed that their propensity to import was stronger than their propensity to export. For instance, MNFs kept buying from their international network of suppliers, and so their installation came with a raise in imports. On the other hand, the FDI, strongly focused on service sectors, didn't generate a lot of exports. From a regional point of view, if the MNFs strategies were to explore the regional market and not to integrate the Mercosur subsidiary on the international production division, their implementation is not going to have a positive direct impact on trade balance.

However, the story is much longer than that because of indirect effects like efficiency improvement, transfers of technology and also the long term impacts of FDI in the financial balance (transfers between subsidiaries, profits repatriation, etc.). We are not going to discuss all these effects in this paper but rather concentrate on three issues: what are the links between FDI and imports, between FDI and exports, and finally, what is the influence of Mercosur in FDI

flows. We don't intend to exhaust these subjects, as we're obliged to make some simplified assumptions. By the way, our results seems to be compatible with other studies done in the same field.

No consensus on the link between trade and FDI arose neither in the theoretical nor empirical literature. From a theoretical point of view, both flows were traditionally considered as substitutes: the FDIs are an alternative to exports in order to penetrate markets protected by strong trade barriers. Nevertheless, if most of the theoretical approaches indicate substitution links between these two flows, empirical results often show the existence of complementarity.

In an earlier work, we have estimated the links between FDI, trade and regional integration (Castilho and Zignago, 2000). Our results did not show any evidence of statistically significant link between the regional integration process and the FDI inflows, even though it attested the complementarity between FDI and imports. These results were surprising. The origin of Mercosur itself is in sectoral trade agreements and, as in the automobile industry, it is clear that the establishment of a common market influenced the strategies of MNCs in Brazil and Argentina (Porta and Kosakoff, 1997). We attempted to find significant results in, at least, some sectors. We have then turned to national disaggregated data and, in the present empirical work, we use them to analyse the linkage of bilateral trade and FDI inflows to Mercosur in the 90's².

The present paper begins with an overview of Mercosur, its trade and FDI flows. The second section outlines the major empirical evidences for the linkages between trade, investment and regionalism.

TRADE AND FDI TRENDS IN THE MERCOSUR

The Southern Common Market (Mercosur) - the custom union between Argentina, Brazil, Paraguay and Uruguay - was created in 1991. Even if the free trade area and the custom union are far from being perfect, on 1st January 1995, they concerned around 85 % of the products. The intra-regional trade liberalisation was spread over four years - from the end of 1991 to the end of 1994 - by diminishing the intra-regional tariffs by 25 % per year. A common external tariff (CET) fluctuating between 0 and 23 % (with an average of 11.3 %) was adopted in 1995. Nevertheless, some sectors (such as equipment goods, computers, telecommunications, sugar,

² The data used here come from national sources, what has several implications : they don't use the same classifications, they have different time coverage and other minor methodological differences. We dispose of Argentinean data for the period 1991-1999 from the CEP (Centro de Estudios para la Producción) and of Brazil data, for 1990-1994 and 1996-1999, from the Central Bank of Brazil.

wheat and the automobile industry) figured in an exception list and were not concerned by this CET³. Some of them are still subjected to special regimes, notably the automotive sector.

The recent Mercosur evolution – and in particular, the CET – has been troubled by the recent macroeconomic difficulties in Argentina and Brazil. In the last six years, the CET was changed twice: first, when Brazil raised the TEC by 3 points in response to the 1998 financial crisis (followed by the other partners); second, in 2001, when Argentina launched a package of measures in order to improve its exports competitiveness – and was again followed by Uruguay and Paraguay. This seems to be the worst crisis Mercosur has passed through during its short life.

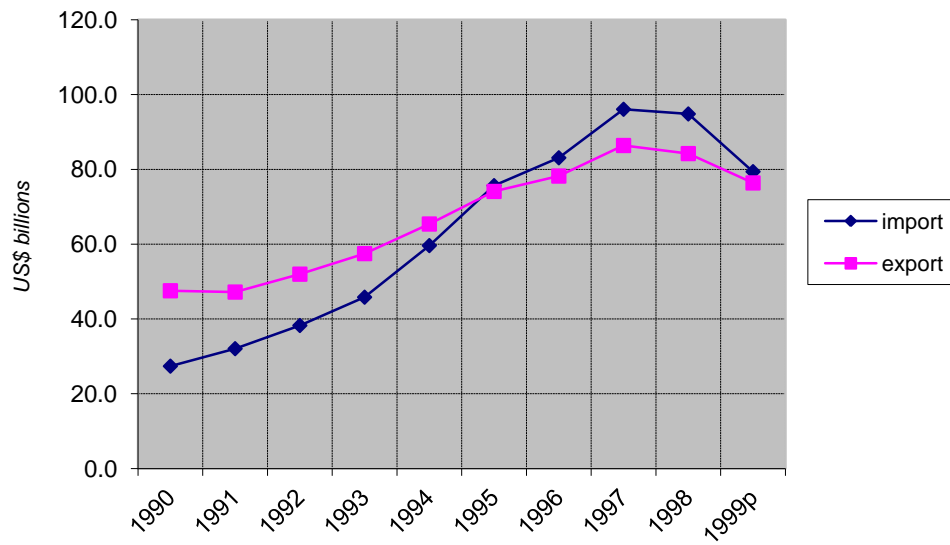
Actually, these countries are involved in some regional negotiations, like the FTAA (the Free Trade Area of the Americas), the FTA with the European Union and the one with the Andean Community (CAN). The effects of these negotiations are opposite: the first one made Mercosur countries think about the pertinence of maintaining the imperfect Common Market in a bigger regional FTA. At the same time, the other ones reinforce Mercosur because the negotiations are between groups of countries – and can not be conducted between the isolated countries.

We must outline that intra-regional tariff reduction in the first part of the decade coincided with multilateral liberalisation programs led separately by each of the member states. Fundamentally, the implementation of Mercosur occurred in a context of a large adjustment process and deep economic reforms that pointed out an important change in the development strategy of the Latin American countries. Those countries also undertook measures of financial liberalisation, such as the strong reduction of control on capital flows. Another important feature of this process is the deregulation and the privatisation process. The privatisation has affected a lot of sectors and let foreign investors participate in the purchase of national enterprises. This process started in Argentina and has, until now, gone further there than in Brazil. These changes, together with the recovery of economic growth and the implementation of a common market, have contributed to the rise of FDI in the region.

The Mercosur's trade flows substantially increased during the 1990s, as we can see in Graphic 1. This growth was led mainly by imports. Between 1990 and 1999, imports' growth was 190%, while exports growth was 60%. As a consequence, Mercosur's countries presented, from the middle of the 90's, a growing trade balance deficit. This seems to be a reflex of domestic economic expansion, trade opening and exchange rate evolution.

³ Argentina, Brazil and Uruguay were allowed to keep 300 products outside the CET until January 1st 2001 whereas Paraguay can maintain 399 products till 2006. The list of exceptions was anyway modified by the measures taken by Argentina lastly.

Graphic 1: Mercosur's total trade. 1990-1999.



Source: IDB.

These trends seem to benefit mainly the OECD countries (as shown in table 1, their weight in the Mercosur's imports rose from 40 % in 1985 to 67 % in 1998), even if the intra-trade's growth rate was higher. The role of OECD as the most important supplier was enhanced, but its importance as a destination for Mercosur's exports was weakened (showing the loss of dynamism of the Mercosur's exports).

Table 1. Mercosur's main trade partners

	Total Flows				Imports		Exports	
	1986 (%)	1990 (%)	1995 (%)	1999 (%)	1999 (%)	growth rate 95/99 (%)	1999 (%)	growth rate 95/99 (%)
European Union	23.1	25.6	27.1	27.4	28.7	8.1	25.9	5.1
NAFTA	26.1	23.4	20.6	23.0	24.8	8.9	21.1	32.8
United States	22.8	20.3	18.0	20.0	21.7	11.0	18.2	27.3
MERCOSUR	9.9	11	19.5	19.8	19.3	9.4	20.4	5.4
Argentina	3.4	3.5	7.6	8.3	8.7	4.2	7.8	32.4
Brazil	4	4.6	8.3	8.6	8.5	21.6	8.7	-1.4
Paraguay	1.1	1.2	1.8	1.3	0.7	-13.7	1.9	-29.0
Uruguay	1.4	1.7	1.8	1.7	1.4	-5.6	2.0	1.4
Chile	1.6	2.2	3.2	2.8	1.8	-23.5	3.8	3.1
Andean Community	1.6	2.2	3.5	3.0	2.3	12.8	3.8	-18.3
Asian NICs	2.3	4.8	6.5	5.0	5.6	-11.5	4.3	-27.7
Japan	6.3	5.9	5.2	4.3	4.8	-5.6	3.7	-23.3
China	2.2	1.1	2.0	2.1	2.4	55.6	1.7	-24.5
Total	100	100	100	100	100	6.0	100	5.6

Source: BID-INTAL.

As told before, FDI (together with portfolio investment and short term capital) played an important role in financing the current balance deficit of Mercosur economies in the 90's. In fact, the 90's are marked by the return of Latin American countries to financial markets.

The growth of FDI was very strong during the decade, as shown in table 2. Indeed, it was more vigorous than the trade growth. As stressed by Chudnovsky (2001), Mercosur countries were responsible for 6% of FDI flows to developing countries between 1997 and 1999. In fact, this is explained by a conjunction of factors, like the macroeconomic stabilisation and the economic recovery in the region, as well as the change of the regulation environment (led by the privatisation process and the trade and financial liberalisation). The formation of Mercosur itself had contributed to the growth of FDI, as we will see later.

Table 2: FDI inflows to Mercosur*(Millions of U.S. Dollars)*

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999p
Argentina	1 836	2 439	3 218	2 059	2 477	3 818	4 922	5 099	4 504	22 358
Brazil (1)	324	89	1 924	801	2 035	3 475	9 644	17 879	26 346	31 235
Paraguay	77	86	118	75	137	155	246	270	423	306
Uruguay	102	155	157	137	113	155	229
Mercosur	2 237	2 614	5 260	3 037	4 804	7 605	14 949	23 361	31 428	54 127

Source: IADB and (1) 1996/2000: BCB

The main investors are the European countries, as the individual tables for Argentina and Brazil show in the next sections. The United States is the second investor. Together, these countries are responsible for 99% of total FDI in Mercosur countries in 1999.

In terms of sectoral distribution, the service sector became the main receptor in the last years. It has replaced the leading position of the industrial sector in Argentina in the beginning of the decade and lately, the same has happened in Brazil. This is mainly explained by the privatisation process that brought foreign capital to public utility sectors, like telecommunications. The geographical and sectoral aspects of FDI will be detailed in the next sections, where FDI in Argentina and Brazil is analysed separately. This is not only because of differences in countries' statistics but also to emphasize their differences.

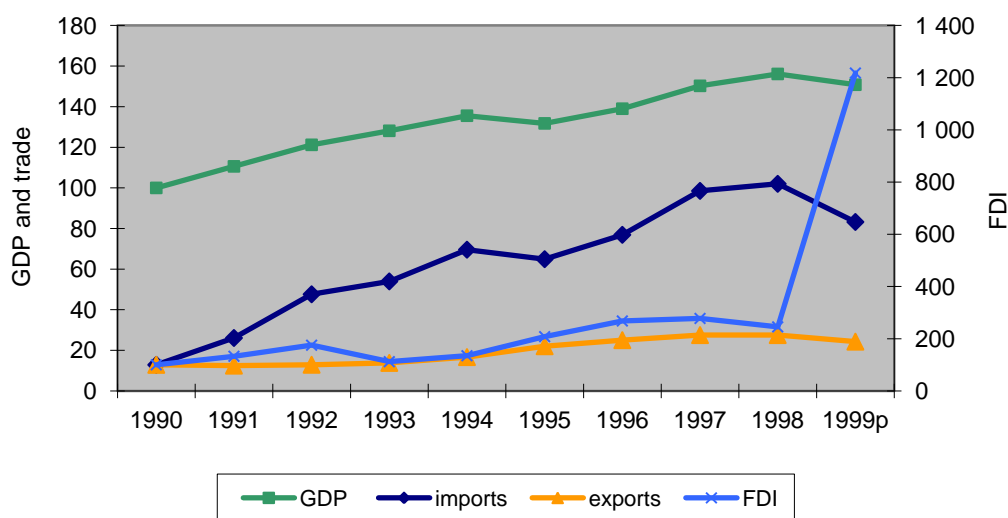
ARGENTINA

The Argentinean economy was characterised in the first half of the decade by the macroeconomic stabilisation and trade liberalisation process. As a consequence, the recovery of the economic growth led to a strong growth of imports (Graphic 2). In 1995, the peso crisis impacted strongly on Argentinean economy, reducing its growth rates. This impact was minimized by the recovery of the Brazilian economy, the first client for Argentinean exports. But this would not last long as the growing instability in international financial markets (Asian crisis in 1997 and Russian crisis in 1998) strongly affected these countries. The change in Brazilian exchange regime in 1999 and the economic recession reinforced the already existing competitiveness and the consequent balance of payment problems in Argentina.

In contrast, exports volume grew by a much lower rate. This trade imbalance is directly related to the appreciation of the Argentinean peso, which rate was fixed to the US dollar in 1991. As a consequence, its exports loose competitiveness and the imports were boosted in a period of

growing domestic demand. FDI flows⁴ were multiplied by almost 3 between 1990 and 1997 (table 2) but there is a boom in 1999 with US\$ 22 billions of FDI inflows.

Graphic 2: Argentina: GDP, FDI and Trade (base: 1999=100)



Source: ECLAC, IADB.

As Table 3 illustrates, the FDI flows are concentrated in four sectors that responds for 74% of total industrial FDI. The sector which received more investments is oil and gas, a fact that is deeply related to the privatisation of the national petroleum firm YPF in the beginning of the 90's. All along the decade, the exploitation of Argentinean oil and gas reservations has also raised significantly. The second sector in terms of receiving FDI is electricity and again privatisation is in the origin of the FDI growth. Food and beverages have absorbed 12% of total FDI, followed by the automotive sector. In contrast with the first two sectors mentioned before, the investment in these last two industries was mainly greenfield.

⁴ The aggregated statistics come from BID/IRELA (1998) and OECD, so the source is the Balance of Payments, what explains the differences to the national data.

Table 3: Argentina: FDI by activity. 1995-1999.

Sector	1990/94		1995/99		1990/99	
	US\$ millions	%	US\$ millions	%	US\$ millions	%
Oil and gas	3 271	30,4	22 457	38,3	25 728	37,1
Electrical energy	2 452	22,8	8 054	13,7	10 506	15,1
Food and beverage	1 855	17,2	6 279	10,7	8 134	11,7
Automotive industry	755	7,0	6 016	10,3	6 771	9,8
Products of oil and gas	705	6,5	3 245	5,5	3 950	5,7
Chemistry	643	6,0	2 988	5,1	3 631	5,2
Mineral extraction	89	0,8	2 664	4,5	2 753	4,0
Pulp and paper	158	1,5	1 758	3,0	1 916	2,8
Petrochemistry	0	0,0	1 448	2,5	1 448	2,1
Other industries	847	7,9	3 737	6,4	4 584	6,6
TOTAL	10 777	100,0	58 645	100,0	69 421	100,0

Source: CEP.

The Table 4 details the origin of the foreign investment in Argentina during the decade. US appear to be the most important investor, if countries are taken individually. If not, European Union is the first foreign investor, responsible for 47% of total FDI. Among European countries, Spain is the most important one (25%), followed by France that responds for 8% of total investments. Some “historical” investors in Argentina like the UK, Italy and Germany had lost their importance. In Mercosur, Brazil is the only investor country, but its participation is very weak – 1,7% of total FDI. Chile’s investments in Argentina are much more important, they correspond to 6,6% of total investments.

Table 4. Argentina: Main Investors Countries.

	US\$ millions	
	1990-1999 (cum.)	
	cumulated flows	%
United States	48.731	38.1
Canada	3.138	2.5
<i>European Union</i>	59.472	46.5
Spain	31.873	24.9
Netherlands	2.412	1.9
France	10.293	8.0
Italy	6.249	4.9
United Kingdom	5.336	4.2
Germany	2.565	2.0
<i>Mercosur</i>	2.363	1.8
Brazil	2147	1.7
Uruguay	216	0.2
Chile	8.411	6.6
Mexico	1494	1.2
Switzerland	1.296	1.0
Japan	407	0.3
Others	2.693	1.9
TOTAL	128.005	100.0

Source: CEP

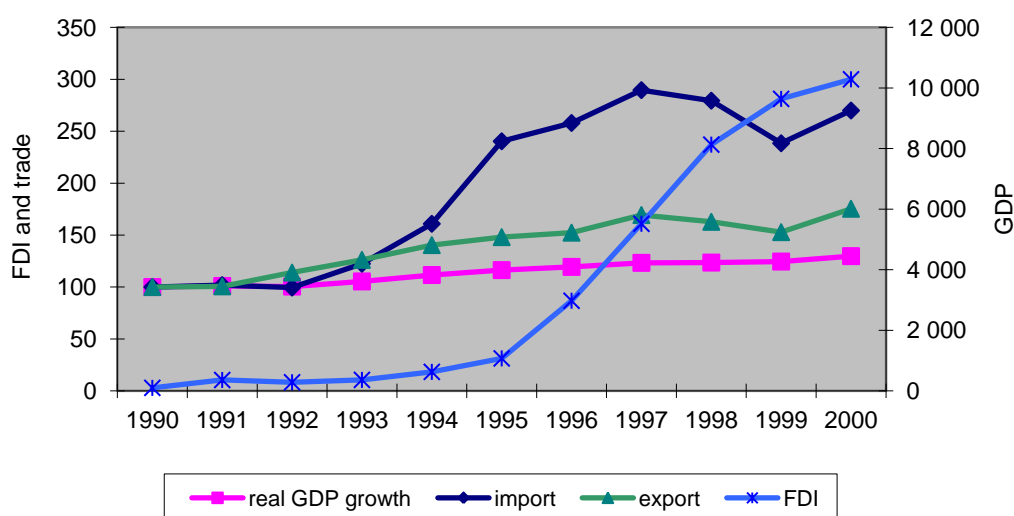
BRAZIL

For the Brazilian economy, the 90's can be divided in two periods. The first half of the decade is marked by a slow economic growth, due to the political and economic instability - see Graphic 3. In 1994, a new stabilisation program was implemented, inaugurating a period marked by low inflation and economic growth. The recovery of the economy is marked by a strong growth of imports and very strong inflows of foreign direct investment. The exports, however, presented a mediocre performance – 75% increase in 10 years contrasting to 170% growth of imports.

From 1995 to 2000, the investment inflows were multiplied by 10. This can be partially explained by the privatisation process – the Brazilian Central Bank estimated for 1997 that about 28% of FDI inflows were directed towards privatisation – and by acquisition of Brazilian companies.⁵

⁵ See Bonelli (2001) to a detailed analysis of merges and acquisitions in Mercosur countries.

Graphic 3: Brazil: trade, FDI and GDP in the 90's (base: 1990=100)



Source: BCB, IADB.

The FDI data by activity (table 5) shows that there are some important changes in the sectoral distribution of inflows in Brazil along the 90's. First, we notice that the inflows directed to services sector have been increasing along the decade. While in 1990 only 24% of total FDI went to this sector, in 2000, about 80% of FDI was directed to services. The industrial sector, that used to absorb most part of foreign investment, lost its position as the major recipient of FDI, even though we notice a new increase in investments into industrial sector in 2000⁶.

The main service sectors receiving FDI are electricity and gas, telecommunications, financial intermediation and services rendered to companies⁷. The increase of FDI inflows to some sectors is related to the advancement of the privatisation process, which led to “an increased inflow of foreign direct investments, reaching US \$5.2 billion in 1997, contrasting with the US \$2.6 billion in the previous year” (BCB, 1998).

Among the industrial sectors, five of them concentrate 85% of foreign investment. The **automotive industry** is the major FDI recipient and in the period between 1996 and 2000, it is the sector that has maintained the most constant level of foreign resources. The other three sectors, which are important recipients, are **chemical products, food and beverage, electronic and communication material** and **machine and equipment**.

⁶ We can not neglect the fact that privatisation rhythm in Brazil has slowed in the last two years.

⁷ As stressed in the Central Bank FDI report, “it is worth mentioning the sharp increase of participation of ‘services rendered to companies’, basically because this group comprises companies whose activity is participation in the share capital (holdings) and , as such, distribute the received funds to companies of other sectors.”

Table 5. Brazil: FDI by activity (US\$ millions).

	12/1995*		1996-2000 (cum.)	
	Stock	%	Flows	%
<i>Agriculture and mineral extraction</i>	688,6	1,6	1 781,0	1,7
Petroleum extraction and related services	72,0	0,2	861,5	0,8
Extraction of ores	330,3	0,8	597,1	0,6
<i>Manufactures</i>	23 402,4	55,0	18 454,6	17,8
Motor vehicles and parts	2 851,3	6,7	4 360,5	4,2
Chemical products	4 747,7	11,2	3 334,5	3,2
Food and beverages	2 332,4	5,5	2 856,4	2,8
Electronic materials and communication apparatus	589,7	1,4	1 686,1	1,6
Machines and equipment	2 072,3	4,9	1 226,6	1,2
Non-metallic mineral products	816,0	1,9	843,2	0,8
Office machines and data processing equipment	441,4	1,0	732,7	0,7
Electrical machines	1 100,3	2,6	685,2	0,7
Rubber and plastic articles	1 317,9	3,1	592,0	0,6
Basic metallurgy	2 566,2	6,0	506,4	0,5
<i>Services</i>	18 439,0	43,4	83 452,5	80,5
<i>TOTAL (US\$ millions)</i>	42 530,0	100,0	103 688,0	100,0

* Data from FDI Census, BCB, 1996. Considered inflows to firms > US\$ 10 million/year. *Source: BCB.*

Considering the investing countries, the EU countries, if taken together, are the major investors in Brazil, as it's been for a long time. However, there are some important changes among these countries. Germany, the historical major European investor in Brazil, reduced strongly its investments. The participation of the United Kingdom has also been reduced from the beginning of the decade. These reductions were more than compensated by the growth of FDI from Spain, Portugal, Netherlands and France. In 2000, Spain became the main foreign investor, responding for more than 30% of inflows, while Portugal consolidated its second place in the rank of investing countries in Brazil. One must notice that these two countries' investments are directed mainly towards services – notably, communication and electricity.

The US investments fluctuated sensibly during the decade, going from 29% of the FDI stock in 1990 to 18% in 2000. Japan and other Mercosur countries have deceiving FDI amounts in Brazil. On the contrary, the investments from fiscal paradises are quite important – almost 10% of total FDI. As this investment comprises investments from other countries and some special forms of operations (including illegal money being repatriated), we cannot take it into account in our analysis.

Table 6: Brazil: Investor Countries

	US\$ millions					
	1990		1995		1996-2000 (cum.)	
	Stock	%	Stock	%	Flows	%
United States	10.488	28.8	10.852	25.5	24.536	23.7
Canada	1.979	5.4	1.819	4.3	1.102	1.1
<i>European Union</i>	<i>14.715</i>	<i>40.4</i>	<i>14.336</i>	<i>33.7</i>	<i>57.018</i>	<i>55.0</i>
Spain	122	0.3	251	0.6	21.548	20.8
Portugal	68	0.2	107	0.3	7.563	7.3
Netherlands	1.179	3.2	1.535	3.6	9.650	9.3
France	1.928	5.3	2.032	4.8	7.902	7.6
Italy	1.303	3.6	1.259	3.0	1.613	1.6
United Kingdom	2.708	7.4	1.793	4.2	2.064	2.0
Germany	5.615	15.4	5.828	13.7	1.676	1.6
<i>Mercosur</i>	<i>85</i>	<i>0.2</i>	<i>1.268</i>	<i>3.0</i>	<i>989</i>	<i>1.0</i>
Uruguay	51	0.1	874	2.1	458	0.4
Argentina	34	0.1	394	0.9	531	0.5
						1.1
Switzerland	3.222	8.8	2.815	6.6	1.118	
Japan	3.440	9.4	2.659	6.3	1.471	1.4
Fiscal Paradises	1.478	4.1	4.668	11.0	14.675	14.2
Others	1.055	2.9	4.114	9.7	2.778	2.7
TOTAL	36.461	100.0	42.530	100.0	103.688	100.0

(1) British Virgin Islands, Cayman Islands, Bermudas, Panama et Bahamas Islands.

Source: BCB.

EMPIRICAL EVIDENCE

In a previous work (Castilho and Zignago, 2000), we have used a gravity approach to test the correlation between trade, investment and regionalism in Mercosur for the period of 1985-1997. The complementarity between FDI and trade was confirmed: the coefficient of FDI inflows was positive and highly significant what indicates a positive linkage between FDI and imports. On the other hand, the link between regional integration and FDI was not significant.

This last result was quite surprising as there is some evidence that recent FDI in Mercosur is linked to an export strategy in the region, at least in some sectors. As shown by Porta and Kosacoff (1997) and Chudnovsky (2001), some MNF installed in one of the Mercosur countries showed interests on exporting. The automotive industry is a good example. The new firms installed in Mercosur manifested their intention to explore the regional market and the benefits of the Mercosur auto-regime⁸. Perhaps, this can not be generalized to all sectors and, if we want to capture them, we need to make a disaggregated analysis. In fact, as stressed by Fontagné

⁸ This doesn't mean that multinational firms plan to export outside Mercosur and then the increase of exports may correspond only – or mainly – to extra-Mercosur exports growth.

(1995), a better analysis of the correlation between trade and FDI requires a bilateral and sectoral approach. However, the lack of disaggregated data concerning FDI flows toward these countries often restrains this kind of analysis.

In this paper, we use a disaggregated gravity approach⁹ in order to examine the linkages between trade and FDI and the influence of regionalism on MNF strategies in the case of Mercosur.

The equation (1) tests the hypothesis of substitution between FDI and imports. For the gravity variables – size and distance – the expected signs are respectively positive and negative. The set of sectoral dummies controls for sectoral specificities. Concerning the investment variable, a negative coefficient would indicate that an increase of FDI would lead to a reduction of imports – confirming the substitution hypothesis – while a positive coefficient would indicate a complementarity relation between investment and imports. This can occur when the subsidiary is an assembling unit (or responsible for just one part of the production process) or when firms keep buying their components from their original suppliers.

$$\ln(M_{ijkt}) = \alpha + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln dist_{ij} + \beta_4 \ln(1 + FDI_{ijkt}) + \sum_k \beta_k D_k + u_{ijkt} \quad (1)$$

where:

- i*: FDI's host country (Brazil or Argentina)
- j*: trade partners
- k*: sectors
- D_k*: sector dummies
- t*: year for the period 1990-1999
- M*: bilateral import flows
- Y*: the current dollar GDP
- dist*: distance in kilometres

The equation (2) tests the linkage between exports and FDI. A positive coefficient for FDI suggests that foreign investments generate exports. One could argue if it would be necessary to consider a temporal lag between investment and exports in order to take into account the maturation time of the first. But, as stressed before, a great part of foreign investments in Mercosur countries in the 90's were acquisitions of public (privatisation) or private firms and, in this case, there's no reason to consider the temporal lag. Anyway, we would consider this result with caution.

$$\ln(X_{ijkt}) = \alpha + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln dist_{ij} + \beta_4 \ln(1 + FDI_{ijkt}) + \sum_k \beta_k D_k + u_{ijkt} \quad (2)$$

⁹ See Fontagné and Pajot (1998) and Chédor and Mucchielli (1998) for other uses of gravity equations to analyse FDI and trade relationship.

Lastly, the equation (3) examines the influence of Mercosur formation on foreign investment strategies. A positive coefficient for the integration variable suggests that the Mercosur integration was an additional factor of attraction for FDI in the 90's. Concerning the gravity variables, the size, from the host country's point of view, might constitute an important factor of attraction and, from the investing country's point of view, it might be an indicator of investment capacity. The geographical distance might have a negative linkage with investment. In fact, more distant are two countries, greater are the transport costs. Also, more incentives have to be produced locally by the firms.

We use two variables to represent the Mercosur integration. The first one is a dummy that equals one after 1995, when the common market was launched. This measure neglects, however, the advances in integration made before 1995 (due to the 1988 sectoral agreements and the liberalisation schedule launched in 1991). We decided then to represent integration by a kind of "revealed trade integration" indicator, that is an ex-post variable corresponding to the part of Mercosur intra-regional trade in its total trade.

The protection indicators (tariffs, for example) are inadequate because, beyond the problem of the choice of the indicator (weighed or not, which weight, tariffs or no tariff barriers, etc.)¹⁰, it would probably not separate the multilateral liberalisation effects from the regional liberalisation effects.

$$\ln(1 + FDI_{ijkt}) = \alpha + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln dist_{ij} + \beta_4 reg + \sum_k \beta_k D_k + u_{ijkt} \quad (3)$$

where *reg* is:

- *dms* = dummy Mercosur: 0 before 1995, 1 after, *or*
- *lms_{kt}* = ln (intra-Mercosur trade / total trade, by sector and by year)

The three equations are estimated separately for Argentina and Brazil, pooling all sectors and years. We use OLS with sectoral dummies. Argentina data comes from the CEP (Centro de Estudios para la Producción) and covers 29 countries, 24 sectors – primary and secondary sectors – and the period between 1990 to 1999. For Brazil, the data from Central Bank covers the same period, 13 primary and secondary sectors and 49 countries. The differences between Argentinean and Brazilian sectoral classifications are of no importance for the results as we analyse them separately.

The Table 7 shows the results concerning Argentina and Brazil. The gravity variables show the expected signs in almost all estimations. Distance coefficients are notably negative and

¹⁰ For a discussion about measures of protection, see Bouët (2000).

significant for all estimates. GDP from the investor country presents positive and significant estimated coefficients in all equations. GDP from the host countries shows negative coefficients in two cases: for Brazil in FDI equation and for Argentina in exports equation. The first result must be analyzed together with the coefficient of the integration variable, as we will see later. The second one suggest that exports performance in Argentina isn't linked to GDP evolution, what simply means that exports are not residual to domestic demand.

The main results of our analysis indicate: i) the existence of a positive and significant relation between FDI and imports in both countries; ii) the existence of a negative but weak relation between FDI and exports in both countries; and iii) an ambiguous effect of integration on investment flows: a positive and strong relation in the case of Brazil and a weaker or inexistent relation in the Argentinean case.

The first result confirms our precedent findings and is not very surprising. The FDI in the 90's in Mercosur lead to a strong increase of imports, as the foreign firms kept buying from their original suppliers. In this sense, the case of the automotive sector is again very illustrative. A detailed analysis of the trade balance shows that the imports of components had grown sensibly during the decade, simultaneously to the installation of new foreign firms.

Concerning the second point, Chudnovsky (2001) shows that foreign firms intend to explore regional markets and that exports are not the main objective of these firms. Even if we think that these results must be examined with caution (because of the neglecting of the temporal lag), they can be explained by several factors: i) firstly, a significant part of investment flows was directed towards the services sector, which are typically non-tradable activities; ii) secondly, part of the FDI was used in privatizations (and in this case, mainly in the services sector) or in acquisitions of national firms, without producing significant changes in the existing production capacities; iii) finally, for a great part of foreign firms, their strategy in investing on Mercosur countries intend to explore regional market and not to create an export platform like in East-Asia or in Mexico, without generating extra-zone exports.

The influence of the Mercosur creation on FDI flows is confirmed by our estimations, wherever integration is represented by a dummy or by the part of intra-regional trade in total trade. The results of both estimations are very close in terms of sign and value of the estimated coefficients. Moreover, gravity variables present the expected sign, except GDP of Brazil whose coefficient is negative. The only significant difference between the two equations is the coefficient of the Mercosur integration that is not significant for Argentina when represented by the part of intra-regional trade in total trade. In other terms, Mercosur seems to be more important to Brazil

than to Argentina .

This raise an important issue about the location of MNF inside Mercosur. One could attempt that the firms established in Argentina would consider the integrated market important as they are a small economy and the participation in Mercosur would make them take benefit from the scale of the big market. For those going to Brazil, the domestic market is already big, exports to other Mercosur countries would be residuals. But our results suggest the contrary and Mercosur seems to favour the location of foreign firms in Brazil. The scale factor, the differences in terms of productivity and even the effects of the different exchange regimes on competitiveness can explain this preference for the big country.

Table 7. Econometric Results

Estimations Results for Brazil								
Dependent Variable:	Imports (1)	Exports (1)	IDE (1)	IDE (2)				
Explanatory Variables:	OLS	OLS	OLS	OLS				
R2	0.58	0.66	0.53	0.52				
Number of observations.	1981	2098	2214	2214				
Intercept	-15.89 ***	-2.83	6.85	3.95				
	-4.24	-1.04	0.61	0.34				
Distance	-1.37 ***	-1.46 ***	-2.12 ***	-2.52 ***				
	-15.23	-23.04	-8.28	-9.63				
PIB investor country	1.07 ***	0.88 ***	3.41 ***	3.75 ***				
	26.30	30.31	36.75	38.51				
PIB Brazil	1.16 ***	0.36 **	-2.21 ***	-2.04 **				
	4.09	1.72	-2.62	-2.30				
FDI	0.05 ***	-0.01 *						
	6.88	-1.74						
Mercosur integration	0.46 **	0.02	4.85 ***	12.23 ***				
	2.28	0.15	7.92	3.93				
Estimations Results for Argentina								
R2	0.59	0.64	0.20	0.20				
Number of observations.	5869	5497	6960	6960				
Intercept	-27.68 ***	14.25 ***	-15.59 ***	-19.43 ***				
	-17.39	7.27	-6.02	-8.92				
Distance	-1.65 ***	-2.32 ***	-0.96 ***	-0.96 ***				
	-42.66	-58.18	-17.51	-17.22				
PIB investor country	1.18 ***	0.98 ***	0.72 ***	0.73 ***				
	60.97	48.70	28.13	27.89				
PIB Argentina	2.05 ***	-0.84 ***	1.40 ***	1.75 ***				
	13.52	-5.24	6.77	10.35				
FDI	0.05 ***	-0.02 *						
	6.52	-1.92						
Mercosur integration	-0.75	0.40 ***	0.24 ***	-0.04				
	-1.16	5.92	2.62	-0.69				

Notes: *** signif. at 1% level, ** at 5% and *at 10%, the t-statistics figure below the coefficient values. Coefficients of sector dummies are not presented. IDE (1): integration represented by Mercosur dummy (equals 1 for t>1994); IDE (2): integration represented by the part of intra-zone trade in total trade.

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