

FOREIGN DIRECT INVESTMENT IN BRAZIL

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I. INTRODUCTION*

The economic situation of Latin American countries has changed considerably in recent years. Reforms aimed at liberalizing and opening up the economies have been undertaken, and the objectives of attaining monetary stabilization and fiscal balance have been prioritized. As a consequence, the region is increasingly arousing the interest of transnational corporations and experiencing a dramatic growth in foreign capital inflows, particularly in the form of foreign direct investment (FDI). In this context, the case of Brazil appears to be particularly interesting. The country is the largest FDI recipient in the region and has recently acquired a position at the forefront among developing countries, similar to the one it had before the outbreak of the debt crisis in the beginning of the 1980s.

This study tries to understand the situation of Brazil as a host to FDI, and explain the evolution in recent years. More specifically, it tries to answer the questions of: How has FDI in Brazil evolved over the years? What has determined this evolution? What has led to the rise in FDI in recent years? How is this likely to affect Brazil's economy?

The structure is as follows: First of all, in section II, comes an introduction to a theoretical framework for FDI. There, a model is presented for interpreting modern FDI flows which backs up the whole study. Section III is the presentation and discussion of FDI in Brazil. The empirical analysis comes in section IV, including both a description of the model and a presentation of the results. Finally, section V presents a final discussion and conclusions from the whole of the study.

II. A THEORETICAL APPROACH TO FOREIGN DIRECT INVESTMENT

Foreign Direct Investment (FDI) is defined as an investment by an entity in one economy (investor) in an enterprise in another economy (foreign affiliate), involving a long-term relationship and reflecting the investor's lasting interest and control of the affiliate (UNCTAD, 1998:350).

* The present paper is a shorter version of a report prepared on the same subject. The author wishes to thank the Editor of this journal for comments and suggestions in improving this article.

This kind of investment reflects the activities of Transnational Corporations (TNCs) away from their home country and may consist of widely different ventures, which have only a few traits in common. This raises difficulties when attempting to provide a theoretical framework encompassing the different varieties of FDI.

In an initial approach, TNC activity may be classified according to the objectives that it seeks to fulfill. Four main types of TNCs can be identified considering their foreign activity (Dunning, 1993):

- Resource seekers
- Market seekers
- Efficiency seekers
- Strategic asset seekers

Resource seekers invest abroad to obtain a particular resource at a lower cost or of a different quality than they could obtain in their home country. This is done in order to raise competitiveness in the markets that the companies serve elsewhere. The resources that these firms may seek to obtain or reach include physical resources (such as natural resources or agricultural products), labor (for labor intensive products that are exported) and intangible assets (technology, management expertise etc.). Other companies, those engaging in market seeking activities, are interested in new markets, which offer opportunities for profitability or growth. These companies will be particularly interested in large markets and markets with high growth rates, but they are also influenced by other characteristics, like local consumer preferences.

Efficiency seeking TNCs seek to maximize the benefit from their international activities by taking advantage of differences in factor endowments between different countries or exploiting economies of scale and scope. They seek to improve their competitive position through the optimal combination of geographically dispersed activities and are particularly concerned with input costs, productivity, infrastructure, access to markets and the economies of scope, scale and common governance. The goal of strategic asset seekers, finally, is to acquire assets from foreign companies in order to strengthen global competitiveness in the long term. They are considered to be of little relevance for FDI in Latin America so far (CEPAL, 1998b).

This approach helps to classify foreign activity according to the motives behind it, but it is not intended to offer any closer explanation of this activity. Because of the diversity of factors involved, the theories that attempt to explain TNC activity stand somewhere between macroeconomic theories of international trade and microeconomic theories of the firm. Three widespread approaches to explaining TNC activity and FDI can be found in

economic literature. The first approach has its base in 'internalization theory', and focuses on explaining why certain international transactions are carried out within companies (within hierarchies) rather than through the use of markets (Dunning, 1993). In this approach, firms engage in FDI when the total benefits of organizing foreign activity by owning foreign affiliates surpass those of using market mechanisms. It is then usually motivated by a high cost of organizing cross-border markets for certain products (mostly intermediate products). The main weakness of this approach is that it does not incorporate the differences between countries (location-specific variables) that give rise to international transactions. This makes it unsuitable for a location-centric study like the present one. A second approach is a 'macroeconomic perspective', centering on the issue of why certain countries engage in FDI (Dunning, 1993). This approach is closely related to neo-classical theory of factor endowments, expanded to explain trade in intermediate products by incorporating such aspects as technology and management skills. It essentially views FDI as a way for a pair of countries to complement each other's comparative advantages. This approach, however, fails to explain international activity that is related less to differences in factor endowments and more to economies of scale, product differentiation and market failures in general. In this sense, it does not consider the possible benefits of internalization as an alternative to the market and falls short of explaining much of the modern FDI, for instance in service industries.

The third approach, which is the one that will be used in the present study, is the 'eclectic paradigm' (or OLI model). This approach draws from traditional trade theory to explain output distribution induced by differences in factor endowments. It argues, however, that in order to explain the ownership of this output, as well as the distribution of more complex production, market failures must be considered (Dunning, 1993). On one hand, there is a market failure that discriminates between firms in their ability to gain and use assets, as well as manage activities at multiple locations. On the other hand, there is a market failure in the intermediate products market, which sometimes makes it more efficient for firms to expand hierarchically than to use markets.

This view brings out the spatial distribution of factor endowments and economic organization together with firm specific assets and abilities as key factors configuring international trade and production. International economic activity then becomes determined by variables such as the structure of markets, transaction costs and firms' management strategies, as well as the distribution of factor endowments. The eclectic paradigm

condenses this reasoning into three key factors – advantages – that determine TNC activity (Dunning, 1993):

- Ownership-specific advantages
- Location-specific advantages
- Internalization advantages

Ownership-specific advantages (O advantages) are assets, which provide a company with a competitive advantage over other local and foreign firms which service the same market. The O advantages largely derive from the possession of intangible assets as well as the management of cross-border activities. They may consist of a wide range of factors, including management, organization and marketing skills, technology, access to markets, physical and human capital, economies of scale and scope, proprietary knowledge, finance and innovatory capacity.

The location-specific advantages (L advantages) are assets, which are specific in their origin and use to a given location, but available to all firms there. Moreover, they are not available (or not available at the same terms) in other locations. L advantages condition whether or not it is beneficial for a particular company to exploit (or expand) its O advantages in a given location, and thus determines where TNC activity is carried out. Natural resources, material and labor costs, market size and characteristics, transport and communications infrastructure, investment incentives and barriers to trade are some of the factors that can become L advantages in a given country.

Furthermore, internalization advantages (I advantages) arise when a company finds it to be more efficient to exploit its O advantages within the company's borders rather than selling or licensing them to foreign companies. That is, they determine how foreign activity by TNCs is organized. I advantages appear when markets fail to organize cross-border transactions in an optimal way. Examples of factors that may become I advantages include negotiating, transaction and moral hazard costs, buyer uncertainty, quality considerations, supply stability, industrial property rights and time-lags, as well as economies of common governance, vertical integration and horizontal diversification.

This approach asserts that TNCs will engage in foreign activities only when the following conditions hold: 1) the firm has sustainable O advantages against other firms in the market that it plans to service; 2) there are considerable L advantages in the foreign location; 3) the I advantages make it more efficient for the firm to establish itself abroad than to use cross-border markets; and 4) foreign activity is consistent with the firm's long-term strategy.

The eclectic paradigm attempts to explain all foreign activity with this framework, providing an answer to why, where and how companies engage in foreign ventures. It reaches further than the internalization and macroeconomic approaches mentioned above, and proves to be more versatile and complete than any of those. The cost of this versatility is that it becomes too general to construct any specific model that may be tested empirically. It is essentially a framework within which to interpret TNC activity and which brings up groups of factors that condition this activity. As such, it proves to be very useful for this study, allowing for a wide analysis of Brazil's situation as FDI host and the various factors that affects it. Despite the fact that the paradigm is robustly built upon economic theory, there is sometimes a lack of clarity as of the exact definitions of its different components — a problem which is likely to be related to the fact that it encompasses such varied factors. Perhaps because of this problem, it is often presented in a simplified way, which is both intuitive and useful (see for instance, UNCTAD, 1998). At the present, the eclectic paradigm is, no doubt, the most enlightening and widely used approach for explaining TNC activity and understanding FDI (UNCTAD, 1998).

The framework which has been exposed above indicates that changes in the investment position (outward or inward) of a particular country may be explained by a variety of factors, including changes in the O advantages of local companies relative to those of other nationalities, changes in its L advantages relative to those of other countries, changes in the I advantages perceived by firms, and changes in companies' strategies, which determine their reaction to any given combination of O, L and I advantages. Out of these, the L advantages are the only ones over which a country has any direct control. In this sense, a country can to a certain extent affect its FDI inflows. The host country variables that determine foreign firms' investment may undergo changes as the economy evolves, policies change and reforms are driven through. Countries have direct control of policy determinants of FDI (e.g. macroeconomic policies or trade and investment regimes) but these are by nature only enabling factors. Other factors, mainly economic, are the true driving force behind FDI. Some of these may also be controlled, but only in an indirect way. Input prices, for instance, are affected by industrial policies and taxes, but are not directly controlled by governments. This limits the possibilities for countries with weak set of economic determinants to largely affect their FDI position through policies and other measures. Countries that are richly endowed with attractive economic factors, on the other hand, are better positioned to influence their investment situation in any desired direction though the use of policies and other measures. The actual effects of FDI on the host economy are a

complex issue. Some of its possible benefits include integration into the world economy, transfer of technology, skills and innovatory capabilities, contribution to the capital stock, access to world markets, increased competition and spreading of management and organization knowledge. Many of these effects work through spillover effects, when TNCs interact with local companies. There are other aspects of FDI that may be less beneficial for the host country. These include costs of incentives offered by governments, transfer pricing, reliance on foreign suppliers and the use of technology and practices which are not applicable in local companies (UNCTAD 1995 & IDB/IRELA, 1998).

III. FDI IN BRAZIL: AN OVERVIEW

At the beginning of the 1980s, Brazil was the seventh largest FDI recipient in the world, surpassed only by developed economies (CEPAL, 1998b). For many decades, Brazil had been a favorite destination for European and North American investment, but with the outbreak of the debt crisis this situation changed radically. Brazil's economy deteriorated and the debt problem, macroeconomic instability and low growth rates became strong disincentives for foreign investors. In consequence, FDI inflows fell: by 1990, Brazil had become the eleventh FDI recipient in the world and by 1995, the twentieth (CEPAL, 1998b). Over this period of time, Brazil also lost in importance within Latin American FDI, receiving 33 percent during 1980-85 and only 12 percent during 1991-95 (Nunnenkamp, 1997). In the beginning of the 1990s, other countries in the region had started to receive large inflows but FDI in Brazil did not increase substantially.¹ In fact, FDI did not regain the size of pre-crisis flows until in 1995. Brazil had a late start in the new wave of investment in Latin America but once FDI took off, it grew quickly. FDI inflows increased dramatically from USD 1.9 billion in 1994 to 17 billion in 1997 (Table 1). In 1996, Brazil regained the position as the region's largest FDI recipient (UNCTAD, 1997), and one year later FDI had multiplied almost twenty-fold compared to its 1990 value (Table 1). All in all, FDI flows since 1996 (estimated at around USD 50 billion) have been larger than the previously accumulated all-time FDI stock in the Brazilian economy (USD 42.5 billion in 1995) (Tables 1 and 2).

Table 1- Net FDI Inflows in Brazil 1980-98 (USD millions).

1980-89	1990	1991	1992	1993	1994	1995	1996	1997	1998 ^a
1,766	901	973	1,580	714	1,971	4,312	9,976	17,085	26,515

^a Preliminary, Banco Central do Brasil (1998).

Source: CEPAL (1998b).

The spectacular growth of FDI in Brazil in recent years is not an isolated phenomenon. Worldwide FDI flows have grown from around USD 200 billion in 1990 to over 400 billion in 1997 (UNCTAD, 1995 & 1998). The participation of developing countries² in these flows has also increased substantially, from 16 per cent of worldwide flows in 1990 to 37 percent in 1997 (UNCTAD, 1995 & 1998).³ At the same time, portfolio investment in developing countries has also grown spectacularly.⁴ In this process, bank loans and development aid have been replaced by portfolio and direct investment as sources of foreign financing (IDB/IRELA, 1996). These large foreign investment inflows contrast sharply with the exceptionally low levels following the debt-crisis, when most Latin American countries had been isolated from global capital flows. Within this new context, Latin American countries and the region as a whole have increasingly been incorporated into TNCs' global strategies (Ibid.: 1996). As a result, FDI inflows to the region grew from almost USD 9 billion in 1990 to 26.7 billion in 1994, and again more than doubled to USD 56 billion in 1997 (UNCTAD, 1995 & 1998). This favorable evolution of FDI on the regional level is increasingly relevant for Brazil, since foreign companies more and more tend to adopt a regional or sub-regional strategy, viewing the MERCOSUR⁵ countries as a unit where Brazil has the largest market (IDB/IRELA, 1996 & 1998).

Brazil's main attractiveness for foreign investors (the main L advantage) is its large market – in 1997, Brazil was the seventh economy of the world in terms of GNP (World Bank, 1999). The formation of MERCOSUR also provides favorable access to other markets in the region, further enhancing possibilities for market-seeking companies. In the past, the combination of the large domestic market with import-substituting policies made it possible to attract "tariff-jumping" FDI in manufacturing industries. Consequently, TNCs have contributed significantly to the Brazilian manufacturing capacity, particularly in capital - and technology-intensive industries like chemicals, machinery and transport equipment, accounting for 70 percent of the FDI stock in 1990 (CEPAL, 1998b; Banco Central do Brasil, 1998).⁶

During the present decade, there has been a shift in Brazil away from inward-looking import substituting type of trade and investment policies to an outward-looking export-oriented regime (in the terms of Ozawa, 1992). During 1990-95, in a rapid process of trade liberalization, most non-tariff barriers were removed and tariffs substantially lowered – customs duties fell from an average of 80 percent in 1985 to around 14 percent in 1995 (EIU, 1998 & IDB/IRELA, 1996:32). In 1995, trade with the MERCOSUR countries was further liberalized and a common external tariff was introduced. While this liberalization did not help in solving the current account problem, it

was expected to increase Brazil's integration into the world economy and improve the country's long-term competitiveness.

The ample trade liberalization can be expected to affect FDI in two different ways. On one hand, it makes it possible to service the Brazilian market with exports to a larger extent than before, reducing the incentives for tariff-jumping FDI (eliminating L and I advantages).⁷ On the other hand, TNCs loose their protected position in the domestic market and are exposed to greater competition. Increased competition, however, may have a positive effect on FDI. It could force TNCs to invest in order to become more competitive and defend market positions (altering the conditions of market-seeking TNCs). Trade liberalization can also allow for more cost efficient production (e.g. with cheaper imports of intermediate goods) and widen the possibilities to participate in international production schemes. This creates greater incentives for efficiency-seeking investment in Brazil, adding to the set of L advantages. Survey results seem to indicate that the final effect of trade liberalization on FDI has been positive (CEPAL, 1998b).⁸

Trade liberalization is part of a wider set of economic reforms, also comprising macroeconomic reforms, deregulation and privatization. In 1994, the "Real Plan" was launched in an attempt to stabilize the Brazilian economy. This Plan has succeeded in controlling inflation, introducing a certain degree of stability into the Brazilian economy and reducing disincentives for foreign investors. Despite improvement in many areas, the country still suffers from major macroeconomic problems, including large current account and fiscal deficits (IDB, 1997). As a result, Brazil went through a currency crisis in the beginning of 1999. FDI inflows during early 1999 do not appear to have been adversely affected by this crisis, having surpassed 1998 flows for the same period.⁹ In combination with the macroeconomic reforms, domestic markets have been substantially liberalized, transactions simplified and many restrictions eliminated (World Bank, 1996). As a part of this deregulation, there have been important changes in legislation affecting foreign companies. During 1991-95, most restrictions have been eliminated, capital outflows have become freer and foreign companies now receive national treatment (EIU, 1998). This has opened up new business opportunities for foreign companies in sectors that had been closed earlier on – particularly in service sectors – creating new L advantages in the Brazilian economy.

The Brazilian privatization program started in 1990 and is the largest one in Latin America. During 1990-2001 revenues are expected to total close to USD 100 billion (CEPAL, 1998b). The resources are badly needed to finance a difficult fiscal adjustment, but privatization is further expected to contribute to economic modernization, the strengthening of international competitiveness and the restructuring of the public sector (IDB, 1997).

During 1996-97, investment related to privatization accounted for 27 percent of FDI inflows (Banco Central do Brasil, 1998). From 1991 up until late April 1999, foreign investors had acquired 43 percent of the USD 70.3 billion collected from privatized assets. An initial stage of the privatization program, comprising mostly companies in the steel and petrochemical industries, was driven through in 1990-94 with limited foreign interest. Most of the foreign interest in privatization has been within the field of public service and communications, in a second wave of privatization that started in 1995. The sectors in this second wave include electricity and gas, financial services, telecommunications and trade. Foreign participation has been most intense in the privatization of telecommunications companies, where it adds up to 59 percent. The US, Spain and Portugal completely dominate among foreign participants, having acquired 33 percent of the total of privatized assets (with 76 percent of the foreign capital) (BNDES, 1999).¹⁰ The privatization program has been an important L advantage for Brazil and it has opened up significant business opportunities for both local and foreign investors. Most of the foreign companies that have participated in privatization have been new entrants. The experience of other Latin American countries shows that government revenue from privatization has often been complemented by flows to modernize the acquired companies (IDB/IRELA, 1998).

The upsurge in Brazilian FDI in recent years has happened within a business environment that differs substantially from the one during earlier years in Brazil. The combination of new business opportunities with increased competition can explain much of the recent investment from abroad. Two different situations can be identified: on one hand, already present TNCs that find that they need to adapt to a new economic environment; on the other hand, new entrants attracted by the new opportunities appearing in the Brazilian economy (CEPAL, 1998b).

Up to 1995, TNCs in Brazil made little new investment due to the instability of the economy, and instead concentrated in rationalizing local operations. Since 1995, competition, liberalization and improved market prospects have caused these companies revise their strategies (which initially had been developed within the framework of import substitution), making them either restructure or leave the Brazilian market and serve it with exports. The restructuring has resulted in large investments aimed at modernizing or constructing plants, as well as acquiring local companies to strengthen market positions.

New entrants responding to the new opportunities in Brazil after the reforms constitute another important group of investors. They have been particularly intense in the service industry and for these new entrants,

privatization and deregulation have played a major role. The acquisition of existing companies has been a popular entry mode both for new entrants and established foreign affiliates, mainly aiming at obtaining or improving positions in the Brazilian or MERCOSUR markets.¹¹ FDI aiming at reaching protected industries, notably the automobile industry, has also grown.

Table 2 - Sector Distribution of FDI Stock in Brazil

(%)	1990	1995	1997
Primary	3	2	2
Manufacturing	70	55	42
Services	27	43	57
FDI stock (USD million)	30327 ^a	42530	65507 ^a

^a Estimated with 1995 stock and annual flows.

Source: Banco Central do Brasil (1998), CEPAL (1998b).

Service sectors have overall been predominant in the new wave of FDI in Brazil. As a result of the large investments in sectors such as telecommunications, public service and banking, there has been an important shift in the FDI stock from manufacturing to services between 1995 and 1997, as is shown in Table 2. The situation in 1997 contrasts sharply with that in 1990, when manufacturing dominated. The FDI in service sectors is of a market-seeking character, and responds largely to the opportunities opened up with privatization and the elimination of sector restrictions to foreign ownership.

The traditional predominance of capital- and technology-intensive manufacturing has thus been replaced by FDI in service industries as the Brazilian economy has been opened up. Incentives (L advantages) that favored FDI for market-seeking TNCs in a number of manufacturing industries have become less relevant, while market-seeking service TNCs and efficiency-seeking manufacturing TNCs have been offered new opportunities. The reforms have also favored more general market-seeking FDI in manufacturing while resource-seeking investors also face new possibilities.

Despite the fact that manufacturing has become relatively less important in foreign investment (Table 2), there has been considerable new investment by TNCs in several manufacturing industries. During the first years of the decade, manufacturing TNCs concentrated in rationalizing local operations but in recent years there has been a need to expand and become more efficient. This has led established TNCs and new entrants to invest in both building new production facilities and modernizing already existing ones. During the second half of the decade, manufacturing FDI has been concentrated in the automobile industry (51 percent), electronics (19 percent),

chemical and pharmaceutical industries (9 percent) and food and beverages (6 percent) (UNCTAD, 1998).

The automobile industry is a particularly interesting case. This sector has expanded considerably in Mexico, Argentina and Brazil during the 1990s. Mexico's automobile industry has achieved considerable international competitiveness by taking advantage of NAFTA, and it now exports 80 percent of its production (CEPAL, 1998b). In Argentina and Brazil however, production is mainly directed at the domestic and MERCOSUR markets. Due to Brazil's current account problems, high tariffs have been imposed on automobile imports (an exception to the general trend of trade liberalization). Partly in response to these measures, foreign automobile manufacturers have invested large sums in organizing production in Brazil and Argentina. Many companies have taken advantage of the possibilities offered by MERCOSUR to establish regional networks for production and distribution.¹² Productivity has increased considerably in the producing companies, from 7.7 to 19.8 cars per year and employee between 1990 and 1997, and export performance has improved (CEPAL, 1998b). Altogether, foreign automobile companies, some of which are among the largest TNCs in Brazil¹³, have announced plans to invest between 12 and USD 17 billion in Brazil in the years to come (CEPAL, 1998b). In fact, if these plans were to be carried out, by 2000 Brazil would host production by more automobile manufacturers than any other country in the world. The main reason why Brazil has become a favorite destination of the world's automobile manufacturers is the large market, with annual car sales surpassing 2 million units (UNCTAD, 1998).

Table 3 - Geographical Distribution of FDI Stock

(%)	1990	1995	1997
US	28	25	26
EU	40	34	34
Japan	9	6	5
Offshore centers	...	11	18
Other	23	24	17

Source: Banco Central do Brasil (1998).

The geographical distribution of the FDI stock has been more stable than the sector pattern (Table 3) but the flows during 1996-97 have to a large extent come from the US, offshore centers, Netherlands, France, Spain and Portugal (together accounting for 84 percent of totals). Except for the US, these countries have all been more prominent in Brazil during 1996-97 than during previous years, surpassing traditionally more important investors like Germany, Japan, Switzerland and UK (CEPAL, 1998b). There has thus been a shift in the source of FDI flows (although it does not yet show that clearly in the stock), with a great prominence of Southern European countries. This shift

bears a relation to the shift in the sector distribution described earlier on, away from manufacturing and towards services. In this sense, companies from Spain, Portugal and France have shown a tendency to invest in service industries rather than in manufacturing (the companies from these countries seem to have stronger O advantages in service industries than in manufacturing). The prominent position of Spanish and Portuguese companies can in part be attributed to the cultural similarities between the home and host country, which constitute an O advantage for these companies.¹⁴

Since the mid-1990s, the Brazilian government has aimed at using FDI as a means of strengthening public finance, and modernizing and expanding the productive base to improve competitiveness in the medium-term. FDI has also been considered crucial to give relief in balance of payments problems, by financing large parts of the current account deficit (CEPAL, 1998b & IDB, 1997). When considering the effects of recent FDI inflows in Brazil, two things are worth highlighting: first, that recent FDI is related to the transfer of existing assets, and second that it is a concentrated in non-tradable activities (services). These two factors make it unlikely that recent FDI will have a large direct impact on the Brazilian productive capacity or on exports. This does not mean that it will not have an indirect influence on production and international competitiveness, particularly as regards "systemic competitiveness". The investment is expected to lead to improvements in the quality of services and in manufacturing production, affecting the general functioning of the economy, infrastructure and export performance. Furthermore it could contribute to integrating Brazil into the world economy and have a positive effect on overall economic performance (IDB/IRELA, 1998). The recent surge in FDI has, however, not been accompanied by a substantial increase in the investment ratio, since important productivity gains have been possible in both local and foreign companies without incurring in additional investment.¹⁵ An interesting effect of FDI has been observed in some natural resources sectors, where the plans to sell off public companies to foreign investors made these companies adopt more strict environmental policies, since poor environmental management worked as a disincentive for foreign companies (EIU, 1998).

The effect of TNC activity and FDI on the balance of payments is an issue of great concern. FDI has been considered beneficial to the extent that inflows on the capital account help finance a deficit on the current account. However, there are concerns regarding the sustainability of FDI in Brazil, since a large share is related to privatization. It might then be that FDI gives only temporary relief on the current account. Growing FDI inflows have also been accompanied with quickly growing flows of repatriation of capital and

dividends, which further worsens the effect of FDI on the balance of payments. On the other hand, TNCs also seem to have a higher import propensity. However, TNCs play a crucial role in Brazilian exports, accounting for around half of them (Banco Central do Brasil, 1999). This reflects the fact that TNCs have an important position in the Brazilian economy in general – in 1995, they added up to around 10 percent of the Brazilian production (CEPAL, 1998b).

IV. EMPIRICAL ANALYSIS

The aim of this econometric study is to help understand some of the factors that have affected FDI in Brazil during the last two decades. It will use data on aggregate FDI inflows into the country and thus adopts something of a "macro view". Accordingly, the model concentrates variables that reflect the evolution of the economic situation and environment in Brazil, that is L advantages on a national level. The firm- or industry-specific L advantages that foreign investors may search for cannot be reflected directly in this study, since it deals with aggregate flows. The same applies to O and I advantages, with some exceptions.¹⁶

The Variables

An econometric model is constructed from a series of variables provided by economic theory as possible determinants of FDI. Most of variables have been widely used in different studies on FDI. However, there is not a consensus around one model describing FDI inflows. Rather, each study usually constructs a model ad hoc, adapting to its circumstances with its own set of variables. A macroeconomic approach has been used by Campa & Guillén (1996), CEPAL (1998a), IDB/IRELA (1993) and Riveros et al. (1995); while more mixed variables have been used in Lucas (1993), Kwang & Singh (1996), Nigh (1986), Schneider & Frey (1985) and Root & Ahmed (1979). An approach at the industry level can be found in UNCTC (1993), Lall & Mohammad (1983) and Aggarwal (1997). The main differences between models are due to differences in the actual object of study, since FDI may be studied in many ways: in one country (as is the case with this study), in a cross section of countries, in a cross-section of industries etc. In wide terms, the variables of the model have been chosen to reflect such factors in Brazil as market size and growth, level of economic stability, risk, international competitiveness, integration into world economy, degree of openness, and economic reforms and regulatory changes. Again variables that can be expected to reflect L advantages.

Market Size

The host economy's domestic market is perhaps the most important factor for investments by foreign companies, particularly for market-seeking FDI. A large economy not only provides incentives for market-seeking FDI, but also defines the scope of the assets that may be sought by other investors. GDP, GNP or GDP per capita are the most commonly used indicators for the market size. In one form or other they are present in almost all studies on FDI. GDP growth and lagged GDP variables are also often used. GDP (or GNP) variables have almost consistently been found to be significant in explaining the evolution of FDI. The results on GDP per capita and GDP growth have been less conclusive.¹⁷ The present study uses GNP, and GDP growth as independent variables.

Country Risk and Stability

The broad term "country risk" is sometimes included in an economic sense in empirical studies on FDI. In one way or another, it relates to the possibility that the host country will face extreme situations that may seriously affect the operating conditions of foreign firms, such as a financial crisis or the incapability to face debt payments. Country risk can be defined in different ways, most commonly related to the external debt burden. In CEPAL (1998a), it is defined as international reserves as a share of external debt (the higher ratio, the lower risk). On the other hand, in Riveros et al. (1995), it is defined as the ratio between the external debt and exports of goods and services. The ratio between international reserves and imports is widely used in different contexts as an indicator of country risk (showing how many months of imports the country could pay with its reserves).¹⁸ The balance of payments deficit is used by Schneider and Frey (1985) and IDB/IRELA (1993) in a similar sense, indicating the sustainability of the country's external position and the risk of extraordinary measures being adopted.

Inflation can be thought of as a rough measure of the stability of an economy. High inflation may both worsen expectations on future prospects and make business operating conditions more complex, becoming a disincentive for prospective foreign investors. The absence of high and volatile inflation is sometimes considered to be a highly important issue for foreign investors, becoming an significant L advantage in certain countries (Nunnenkamp, 1997). Thus, inflation is expected to be negatively related to FDI inflows. It is used in Schneider & Frey (1985), IDB/IRELA (1993) and CEPAL (1998a).

In the present study, the ratio of imports to reserves is used as an independent variable for country risk and inflation is included to reflect stability (or rather instability); both are expected to work as disincentives.

Internationalization and Competitiveness

An economy's foreign trade gives a rough indication of the extent to which it is integrated into the world economy and gives a hint of its level of international competitiveness. The same assets that make exports competitive can also constitute L advantages for foreign investors, particularly export-oriented companies. If an economy imports a variety of consumer and intermediate goods, and at the same time has competitive exports, it seems likely that there would be more market opportunities for foreign companies with O advantages in relatively sophisticated goods and services than in a less developed economy.¹⁹ A more internationally oriented economy can then be expected to be more attractive to foreign investors. Kwang & Singh (1996) and CEPAL (1998a) both include ratios of the value of exports and imports to GDP as independent variables, showing positive and significant results, while IDB/IRELA (1993) found this variable not to be significant. This same variable²⁰ is used in the present study to measure trade openness.

The real exchange rate is a variable that reflects, and affects, a country's international competitiveness. It can be expected to influence FDI decisions since it affects the value of profit remittances of foreign companies, the cost of imports of intermediate goods, local assets and exports. However, neither theory nor empirical evidence provides for a clear and conclusive relationship between the exchange rate and FDI – not even if it will be positive or negative. The evolution of the real exchange rate has been considered in Riveros et al. (1995), Lucas (1993) and IDB/IRELA (1993). It is also used in the present study. There are other variables that can be expected to reflect internationalization and competitiveness in host countries, for instance wage costs and productivity, the cost of capital, FDI stock and different specific indexes. None of these have been included in this study because of the lack of reliable data.

Qualitative Variables

In Brazil, several events during recent years seem to have had a great influence on FDI. Some of them are changes in policies or attitudes, which may not directly be reflected in the economic variables mentioned above. Examples of such qualitative changes are the start of the privatization process, the creation of MERCOSUR, trade liberalization, changes in legislation affecting FDI and the change of currency to the Real. The present study presents the hypothesis that these changes together have induced a structural change in Brazil's situation as FDI host. In order to test this hypothesis empirically it is simplified somewhat and the structural change is assumed to have happened in 1995. Naturally, this is a simplification – foreign investors' perception of Brazil would not change in only one year – but there are good reasons to assume that 1995 could be a key year. To start with, it was the first

year that the Real Plan from 1994 began to show results. 1995 was also the year when the second wave of privatization was initiated, and when constitutional reforms were made that deregulated important parts of the economy, including several monopolies, and assured national treatment to foreign companies. Finally, it was the time that MERCOSUR came into being, when the member countries removed tariffs on intra-regional trade and introduced a common external tariff.

The hypotheses for the variables included in the model are presented in Table 4.

Table 4 - Hypotheses for the Analysis

Variable	Sign	Explanation
GNP	+	The market size in terms of GNP affects FDI inflows positively.
GDPGR	+	Market growth in terms of GDP growth affects FDI inflows positively.
CPI	-	Inflation as indicated by Consumer Price Index (CPI), affects FDI negatively.
CR	-	Imports/International Reserves = Country risk affects FDI negatively.
TRADE	+	(Exports + Imports)/GNP = International trade affects FDI positively.
RER	+/-	The real exchange rate has an effect on FDI.
D95	+	A structural change occurred in 1995, affecting FDI positively.

The Study

The analysis involves a time-series analysis of aggregate FDI inflows in Brazil during 1980-97 using ordinary least squares (OLS). Two functional forms have been tested and are presented separately (additive and multiplicative). Some more technical issues of the analysis have been placed in the Appendix. The data used has been taken from various sources. The dependent variable, net FDI inflows in Brazil by year, has been taken from ECLAC²¹ (CEPAL, 1998b). It is based on balance of payments figures from the Central Bank of Brazil (Banco Central do Brasil) but it may differ slightly from data provided by other sources such as the International Monetary Fund (IMF). An initial note of caution should be made as respects the quality of the data, since there are serious deficiencies and inconsistencies in most data on FDI (IDB/IRELA, 1998). Still, this is inevitable and applies to all studies on FDI. The sources of data for the independent variables are presented in the Appendix (Table A4). All monetary values have been brought to 1992 prices using the US GDP deflator.²²

The theory on FDI indicates the possible determinants of FDI but it gives no support as to what functional form a model including these determinants should have. This study presents two versions to test the

hypotheses, an additive and a multiplicative (logarithmic) form. The equations are given below.

Additive form:

$$(4.1) \text{ FDI} = \alpha_0 + \alpha_1 \text{GNP} + \alpha_2 \text{GDPGR} + \alpha_3 \text{CR} + \alpha_4 \text{CPI} + \alpha_5 \text{TRADE} + \alpha_6 \text{RER} + e$$

Multiplicative form²³

$$(4.2) \text{ FDI} = e^{\alpha_0} \text{GNP}^{\alpha_1} \text{CR}^{\alpha_3} \text{CPI}^{\alpha_4} \text{TRADE}^{\alpha_5} \text{RER}^{\alpha_6} e^e$$

Using the natural logarithm to transform equation (4.2) we get:

$$(4.3) \ln \text{FDI} = \ln (e^{\alpha_0} \text{GNP}^{\alpha_1} \text{CR}^{\alpha_3} \text{CPI}^{\alpha_4} \text{TRADE}^{\alpha_5} \text{RER}^{\alpha_6} e^e)$$

Equation (4.3) can finally be expressed as a log-log model:

$$(4.4) \ln \text{FDI} = \alpha_0 + \alpha_1 \ln \text{GNP} + \alpha_2 \ln \text{CR} + \alpha_3 \ln \text{CPI} + \alpha_4 \ln \text{TRADE} + \alpha_5 \ln \text{RER} + e$$

A dummy variable (D95) is also used to test the hypothesis of a structural change in 1995. The change is assumed to be continuous²⁴ and is estimated through piecewise linear regression, a method useful for testing hypotheses regarding structural breaks (Pindyck & Rubinfeld, 1991: 117-18). The additive equation looks as follows:

$$(4.5) \text{ FDI} = \alpha_0 + \alpha_1 \text{GNP} + \alpha_2 \text{D95}(\text{GNP} - \text{GNP}_{95}) + [\dots] + e$$

To apply this same test in the multiplicative form, we use the following equation:

$$(4.6) \text{ FDI} = e^{\alpha_0} \text{GNP}^{\alpha_1} (\text{GNP}/\text{GNP}_{95})^{\alpha_2 \text{D95}} [\dots] e^e$$

If equation (4.6) is transformed with the natural logarithm and simplified, we get:

$$(4.7) \ln \text{FDI} = \alpha_0 + \alpha_1 \ln \text{GNP} + \alpha_2 \text{D95}(\ln \text{GNP} - \ln \text{GNP}_{95}) + [\dots] + e$$

D95 adopts the value 0 for all years preceding 1995, and 1 for 1995 and on. The expressions $\text{D95}(\text{GNP} - \text{GNP}_{95})$ and $\text{D95}(\ln \text{GNP} - \ln \text{GNP}_{95})$ thus have the value 0 for all years up until and including 1995. The test of significance for α_2 will serve as a test for the hypothesis of a structural change in 1995.²⁵

Lagged variables, accounting for delayed effects of some factors, are not included in the model. Tests were made lagging those variables that could be the most likely to have a delayed effect (mainly GNP, GDP growth and CPI) but these tests gave no significant results (not reported).

Empirical Issues and Regression Results

The results of the regressions are given in Tables 5 and 6. The GNP variable proves to be the most influential variable, showing a high level of significance in all regressions but one (Table 6, eq. 8). The correlation matrices (Appendix, Tables A1 and A2) shows that this variable is highly

negatively correlated with the real exchange rate variable (RER). This raises the issue of multicollinearity, making it difficult to measure the real influence of any of the two variables. This suspicion is supported by the fact that the real exchange rate, which is generally insignificant, turns significant when the GNP variable is omitted (Table 5, eq. 3 and Table 6, eq. 10). Among the possible effects of multicollinearity is that of large standard errors (and low t-ratios), meaning that the effect of the real exchange rate could be shadowed by the GNP variable (and not so much the opposite, since GNP shows very strong results) and its importance underestimated. The real exchange rate shows a consistently negative effect on FDI, at its different levels of significance. In an attempt to remove multicollinearity, the variables were transformed and first difference regression used in the form: $Y_t - Y_{t-1} = a[X_t - X_{t-1}] + v$ (Gujarati, 1988: 305). This gave completely insignificant results (not reported) for all variables.

GDP growth shows a negative sign (contrary to what might be expected) and turns out not to be significant. This variable shows no influence on the dependent variable and is judged to be superfluous.²⁶ Trade openness (TRADE) shows the expected relationship (positive) at mostly significant levels.²⁷ The correlation matrices (Appendix, Tables A1 and A2) indicate that trade openness is negatively correlated with GNP, but multicollinearity does not seem likely.²⁸ Granger tests between FDI and imports, and FDI and exports respectively, are performed to clarify the causality relation between these variables (Appendix, Table A3). The test provides evidence that FDI Granger-causes imports, and to a very limited extent that FDI also Granger-causes exports.

The country risk variable (CR) shows the wrong sign in all regressions but one (Table 5, eq. 3) and is consistently insignificant. Country risk in this definition does not seem to have had any influence on FDI in Brazil. Other indicators of country risk have been tried (the share of total debt to exports and the share of debt to international reserves) with similar results (not reported). The variable is judged not to have affected FDI, but the positive sign is still somewhat surprising.

The results for the inflation variable (CPI) show a negative influence on FDI inflows (as expected) at mostly significant levels. As regards the hypothesis of a structural break in 1995, the regression results provide mixed evidence. The regression of the additive model (Table 5 eq. 6) strongly supports this hypothesis, providing a very high adjusted R^2 coefficient and t-value. The log-log regression (Table 6 eq. 12) shows considerably weaker evidence in this regard, pointing towards a rejection the hypothesis. Apart from this case, the results from the additive and log-

log equations are mostly consistent in the levels of significance of the variables, and wholly consistent in the signs. There is no strong evidence as to what functional form may more correctly reflect reality.

The Durbin-Watson statistics in Table 5 show considerable evidence of autocorrelation for some of the additive equations.²⁹ This means that the estimated coefficients may be non-efficient and the calculated t-statistics and R-values unreliable. Still, the results of the equations with a high risk of autocorrelation (eq. 1, 3, 4 and 5) are consistent with those where autocorrelation seems less likely (eq. 6 and 2, and the log-log equations), indicating that this problem may have relatively mild consequences for the analysis.

Two regressions were also run to evaluate the relation between Brazilian FDI inflows and aggregate FDI in the world and in developing countries respectively (Table A4). They relate to very much simplified equations.³⁰ The results show that FDI in the world and in developing countries can explain much of the evolution of FDI in Brazil.

Analysis of Results

The domestic market, (GNP) is the most influential variable, indicating that during the whole time studied, FDI has had a close relationship with the absolute size of the economy. This seems to confirm the role of the market size as Brazil's key L advantage. At the same time, market growth rates do not seem to have influenced FDI. This could reflect that investors are not so much concerned with the market's short-term evolution, taking into account that FDI usually is a long-term venture. It is then the overall size, and the long- and medium-term evolution that matter the most.

The variable reflecting international trade shows considerable influence on FDI. This means that a higher exposure to international trade has been accompanied by higher levels of FDI. It can be interesting to point out that the international trade of Brazil has decreased in relation to GNP in the years being studied, from 19.4 percent in 1980 to 14.6 percent in 1997. A better export performance of Brazil in the future could then provide additional incentives to foreign investors. Additional tests indicate that FDI shows a tendency to rise imports. It then seems that the concerns regarding the effect of the recent rise in FDI on imports and the current account would be justified (see section II).

The results show no effect of country risk on FDI. Foreign investors do then not seem to have been concerned with the risk of an external crisis or similar, when considering to invest in Brazil. This could be due to several reasons. To start with, FDI is a long-term commitment and the risk of short-term instability is therefore less relevant than to for instance portfolio investors. Since Brazil has had a mostly poor economic performance during

the time being studied, foreign investors considering to invest in Brazil could also have been rather tolerant to short-term risks captured by the chosen indicator. This is supported by the fact that FDI inflows in early 1999 have been very large despite the crisis at the beginning of the year.

Even though risk does not seem to have worked as a disincentive factor, the results for the inflation variable would seem to show that inflation has worked as a strong disincentive for foreign investment. High inflation has then worked as a disincentive factor for foreign investors and the recent rise in FDI has occurred after the Real Plan brought inflation to single digit levels. Although the general economic evolution during this same period has neither been very dynamic (due to the contracting economic policy) nor very stable (considering the current account and fiscal deficits that led to the recent crisis), the fact is that the surge in FDI has coincided with a time of low inflation. The results for the inflation variable, combined with those for GDP growth and country risk variables, would provide some indications that foreign investors are more concerned with the internal stability than with (short-term) dynamism and external risks. This could be related to a medium-term domestic market-seeking character of most foreign investors. However, one should be careful in drawing far-reaching conclusions in this respect from the results of the regressions.

The real exchange rate would seem to have influenced FDI to a certain extent (its absolute effect is not clear due to multicollinearity), in the sense that a real appreciation has worked as a disincentive for foreign investment. No sharp conclusions can be drawn from these results.

There is some evidence that there has been a structural change in Brazil that is not reflected by the quantitative variables of the model. The additive model provides strong support for this hypothesis, while the log-log model does not support it. It seems possible that the changes in legislation, privatization, and changes in expectations and perceptions may have changed the attitude of foreign investors towards Brazil. It is not possible yet to determine if this is a constant change, as would be the case with the influence of legislation and perceptions, or a temporary change related to the privatization program. The figures available for FDI inflows in 1998 and 1999 would at first sight indicate that the new relation is still present. However, the results of the log-log model should lead to caution when drawing conclusions on a possible structural change.

FDI inflows in Brazil were also regressed against total worldwide FDI flows and total flows in developing countries. The Brazilian inflows proved to be strongly related to the greater aggregates of flows. The regression of these

Table 5 - Regression Results for Brazil 1980-97 (additive model)

Equation no.	1	2	3	4	5	6
Intercept	-22223.55 (-3.734715) 0.0025	3232.738 (0.355638) 0.7274	18951.03 (4.053080) 0.0014	-11027.77 (-0.852216) 0.4095	-14643.74 (-2.336469) 0.0349	-5798.290 (-1.962298) 0.0715
GNP	0.029901 (5.571806) 0.0001	0.014563 (1.838056) 0.0874	- (0.135363) 0.8944	0.023164 (2.428251) 0.0304	0.025786 (5.327669) 0.0001	0.009348 (3.137026) 0.0079
TRADE	77176.62 (2.864893) 0.0133	- (-3.189727) 0.0066	3955.854 (0.135363) 0.8944	45872.28 (1.491146) 0.1598	49103.12 (1.744748) 0.1029	28993.38 (2.315593) 0.0376
CR	348.1098 (0.686751) 0.5043	- (-0.819374) 0.4263	-381.4717 (-0.758522) 0.4617	- (-0.322803) 0.7520	- (-0.322803) 0.7520	- (-0.322803) 0.7520
GDPGR	-49.30375 (-0.310534) 0.7611	- (-0.310534) 0.7611	- (-0.310534) 0.7611	- (-0.310534) 0.7611	- (-0.310534) 0.7611	- (-0.310534) 0.7611
CPI	- (-0.487306) 0.6348	-2.011542 (-3.189727) 0.0066	-2.316556 (-2.939960) 0.0115	-1.324805 (-1.742813) 0.1050	-1.226403 (-1.820383) 0.0901	-0.553544 (-1.810579) 0.0934
RER	- (1.900225) 0.0817	-39.21054 (0.188561) 0.8531	-113.8643 (6.069794) 0.0000	-15.66606 (0.024587) 0.9808	- (1.818611) 0.0921	- (3.233951) 0.0072
D95(GNP-GNP ₉₅)	- (2.498460) 0.0280	- (2.498460) 0.0280	- (4.774180) 0.0003	- (1.497988) 0.1580	- (2.466188) 0.0283	0.134926 (7.801355) 0.0000
Adjusted R ²	0.622483	0.650038	0.552017	0.753891	0.698758	0.942901
F-statistic	8.007761	11.52558	6.236969	9.955517	14.14432	71.18219
(prob)	(0.001749)	(0.000449)	(0.004989)	(0.000650)	(0.000161)	(0.000000)
Durbin-Watson stat.	1.044578	1.717802	1.529041	1.510792	1.497509	1.950437

T-statistics in brackets under coefficients, p values in italic.

Table 6 - Log-Log Regression Results for Brazil 1980-97

Equation no.	7	8	9	10	11	12
Intercept	-8.834109 (-0.487306) 0.6348	13.89728 (0.787199) 0.4443	-28.87015 (-4.447059) 0.0006	24.12804 (4.180373) 0.0011	-5.47517 (-0.321311) 0.7531	-17.31456 (-2.025850) 0.0656
ln GNP	2.132024 (1.900225) 0.0817	0.168598 (0.188561) 0.8531	3.540527 (6.069794) 0.0000	- (0.024587) 0.9808	1.879063 (1.818611) 0.0921	2.498592 (3.233951) 0.0072
ln TRADE	3.422608 (2.498460) 0.0280	- (2.498460) 0.0280	5.021045 (4.774180) 0.0003	1.632988 (1.497988) 0.1580	3.235767 (2.466188) 0.0283	3.875417 (2.917077) 0.0129
ln CR	0.152577 (0.667342) 0.5172	- (0.667342) 0.5172	0.270966 (1.198770) 0.2505	0.005798 (0.024587) 0.9808	- (1.818611) 0.0921	0.249811 (1.066027) 0.3074
ln CPI	-0.153705 (-1.622389) 0.1307	-0.309343 (-3.840360) 0.0018	- (-3.840360) 0.0018	-0.242053 (-2.675877) 0.0190	-0.172335 (-1.945495) 0.0737	-0.054834 (-0.431621) 0.6737

continued...

Table 6 - Log-Log Regression Results for Brazil 1980-97 (...continued)

Equation no.	7	8	9	10	11	12
ln RER	-0.816461 (-0.648567) 0.5288	-1.399429 (-0.990355) 0.3388	-	-2.523914 (-2.612306) 0.0215	-0.868918 (-0.706830) 0.4921	-
D95(lnGNP – lnGNP ₉₅)	-	-	-	-	-	8.394678 (1.122590) 0.2836
Adjusted R ²	0.697424	0.605183	0.674786	0.636657	0.710334	0.716582
F-statistic	8.836858	9.685991	12.75777	8.446922	11.42207	9.596409
(prob)	(0.001028)	(0.001021)	(0.000272)	(0.001381)	(0.000337)	(0.000709)
Durbin-Watson stat.	2.258123	2.134554	1.749066	2.036164	2.115958	2.268468

T-statistics in brackets under coefficients, p values in italic.

Table 7 - Regression Results: FDI in the World and in Brazil 1988-97

Dependent variable: FDI in Brazil (source: UNCTAD).					
Constant	World	Developing Countries	Adjusted R ²	F-statistic (prob)	Durbin-Watson stat.
-10346.69 (-3.200198) 0.0126	0.060687 (4.634981) 0.0017	-	0.694740	21.48305 (0.001677)	1.529810
-2971.855 (-1.510818) 0.1693	-	0.100665 (4.061958) 0.0036	0.632646	16.49951 (0.003624)	0.634782

T-statistics in brackets under coefficients, p values in italic.

very simple equations would seem to indicate that FDI in Brazil is only to a certain extent defined by domestic factors and that it depends a lot on the worldwide evolution of FDI flows.

V. SUMMARY AND CONCLUSIONS

The present study analyzes and presents foreign direct investment (FDI) in Brazil. The study has been divided between a more qualitative part, which presents, discusses and analyzes the different aspects of FDI in Brazil, and an empirical part where a model for FDI inflows is constructed and tested. The underlying theory for the study is the eclectic paradigm.

The main factor in attracting FDI in Brazil is the size of the domestic market and its growth potential. Market-seeking investment stands for a large share of the country's FDI inflows, while efficiency and resources seeking investment stand for a smaller share. As a result of the market size and other factors which may appeal to foreign companies (L advantages), Brazil has received very large FDI inflows during this century. In the 1980s, with the outbreak of the debt crisis, the situation changed and FDI fell while the general economic situation of Brazil deteriorated sharply. FDI continued to be

at low levels in Brazil until 1995, when it started growing quickly. After this sudden change, Brazil has received more FDI than it had during its entire history and the situation contrasts sharply with the isolation from world financial flows in the 1980s.

This illustrates how Brazil in the 1990s has attracted the interest of foreign companies and international investors. The background to this new situation lies in a wide set of reforms, which have been carried out in Brazil since the beginning of the decade. Macroeconomic reforms have succeeded in bringing inflation under control and introduced a certain degree of stability to the economy. Deregulation, privatization and trade liberalization have also altered the business environment in a profound way. As a result, many disincentives and restrictions for foreign companies have been eliminated and new business opportunities arisen. The prospects for the Brazilian economy have improved substantially, while it has also become more open and competitive. This has led to investment by already present TNCs to revise their positions, and rationalize and modernize their activities. Most FDI has however come from new entrants, which to a large extent have entered the Brazilian market by purchasing public or private local companies.

Macroeconomic reforms have influenced the rise in FDI. The empirical analysis shows how inflation has worked as a strong disincentive factor for FDI during the last two decades. Since inflation was brought under control FDI has risen quickly. Performance in other macroeconomic areas has been poorer and the economy has not been growing quickly. This would lead us to assume that general macroeconomic performance cannot have been a too decisive factor for foreign investors. The empirical results indicate that variables reflecting growth and country risk have indeed not affected FDI inflows in a significant way. The fact that FDI evolved very positively in early 1999 despite the crisis at the beginning of the year seems to point in the same direction. The case of Brazil seems to show how inflation can work as a strong disincentive factor for FDI while high growth and stability do not seem to have been necessary for attracting large FDI flows.

Deregulation, privatization and trade liberalization have all played their role in attracting FDI. Much of the new investment would not have been possible without the deregulation of the Brazilian economy; e.g. much of the investment in the service sector, which would not have been permitted. Deregulation has been very important in opening up new business opportunities in Brazil. This has also been the case with privatization, which has attracted much foreign interest. The fears that the rise in FDI would only be a one-time effect of privatization do however not seem entirely founded, since FDI directed at privatization has not accounted for a dominant share of the total. Trade liberalization, finally, has effects of both lowering and raising

FDI. The empirical analysis indicates that a larger exposure to international trade has historically been related to higher FDI inflows. The liberalization has led to increased competition and forced foreign companies to invest in becoming more efficient. At the same time it allows trade to be substituted for FDI to a larger extent than before. Still, it seems that the final effect may be one of attracting FDI.

The rise of FDI in Brazil is not only a result of the new economic situation of Brazil. Worldwide FDI flows have grown quickly during this decade as a part of the trend towards the globalization of the world economy. Other countries in Latin America and in the rest of the world have experienced a dramatic increase in FDI, in the same manner as Brazil has. The empirical results show that Brazilian FDI flows are very closely related to worldwide FDI flows. It becomes clear that the recent rise of FDI in Brazil is part of a worldwide trend, but the growth in Brazil is still much above average.

The rise in FDI in recent years has been accompanied by a change in its composition. While FDI in Brazil was traditionally directed at manufacturing industries, it is now dominated by service industries. In fact, there has been a large shift in the FDI stock from manufacturing to services. This shift is related to privatization as well as deregulation (perhaps also to trade liberalization) and has been accompanied by a shift in the source of FDI. Southern European countries stand for a large share of the new investment while Northern European countries have reduced their share compared to earlier investment.

The impact on the Brazilian economy of this new wave of FDI is likely to be somewhat different from previous FDI. This is due particularly to the shift towards services and to the fact that so much FDI has been directed at purchasing existing assets. These two factors make it unlikely that there will be any large direct impact on the productive base or on exports. TNCs currently account for around half of Brazilian exports, but much of the new investment is in non-tradable activities (services). It seems quite possible, and is supported by the empirical results, that the new FDI may in fact lead to widening the current account deficit. On the other hand, it is expected that communications and public services will improve and allow for a better functioning of the Brazilian economy. FDI could aid in restructuring the Brazilian economy, strengthening its links with the world economy and improving, among other things, international competitiveness.

Further analysis of the implications of FDI for development in Brazil and its effect in different sectors would be of great interest. It would also be relevant to study the consequences of the recent shift towards foreign ownership in the service industries. Furthermore, an empirical analysis

incorporating variables reflecting O and I advantages would help to further understand FDI in Brazil. This kind of variables has not been included in this study because of limitations of time and scope, as well as the difficulties in finding reliable data. Research for other countries has shown that these variables may add significantly to the understanding of FDI inflows (Aggarwal, 1997 and Lall & Mohammad, 1983).

The future evolution of FDI in Brazil will tell whether the large inflows during the last years have been only a temporary phenomenon or if they represent a durable shift. In a more short-term perspective, the evolution of FDI during the rest of 1999 will show to what extent foreign investors have been influenced by the crisis in early 1999. This future evolution will surely depend on how Brazil and its neighbors manage to improve the problematic economic situation that they face today.

Appendix

Table A1 - Correlation Matrix.

	FDI	GNP	GDPGR	CPI	CR	TRADE	RER
FDI	1						
GNP	0.70873	1					
GDPGR	0.01165	0.03940	1				
CPI	-0.38702	0.07625	-0.24215	1			
CR	-0.13629	-0.39804	-0.31895	-0.25513	1		
TRADE	-0.09140	-0.61504	0.10197	-0.47836	0.29932	1	
RER	-0.60921	-0.86436	0.21310	-0.20181	0.21850	0.48679	1

Table A2 - Correlation Matrix (log variables)

	LnFDI	LnGNP	LnCPI	LnCR	LnTRADE	LnRER
LnFDI	1					
LnGNP	0.51907	1				
LnCPI	-0.75074	-0.31544	1			
LnCR	-0.06164	-0.40642	-0.06637	1		
LnTRADE	0.13078	-0.67998	-0.23083	0.27396	1	
LnRER	-0.57489	-0.86553	0.35135	0.32351	0.50112	1

Table A3 - Granger Causality Tests

Null Hypothesis	Obs	F-Statistic	Probability
EX does not Granger Cause FDI	15	3.24353	0.08140
FDI does not Granger Cause EX		1.37386	0.31884
FDI does not Granger Cause IM	15	0.27057	0.84499
IM does not Granger Cause FDI		5.80061	0.02093

Table A4 - Data Sources

Variable	Source	Publication
FDI	CEPAL.	La inversión extranjera en América Latina y el Caribe. Informe 1998.
GNP	World Bank.	World Debt Tables (various years). Global Development Finance 1998.
TRADE	World Bank, International Monetary Fund (IMF).	World Development Indicators 1999. Ibid. Direction of Trade Statistics Yearbook (various years).
CR	World Bank. IMF.	Ibid.
GDPGR	CEPAL.	Statistical Yearbook for Latin America and the Caribbean (various years).
CPI	CEPAL.	Ibid.
RER	Inter-American Development Bank (IDB).	IDB Economic and Social Database.
Total FDI in the world	UNCTAD.	World Investment Report (various years).
Total FDI in developing countries	UNCTAD.	Ibid.

Notes

- 1 According to some estimates the Brazilian FDI stock was actually falling during the first half of the 1990s, when FDI inflows were not large enough to compensate for the depreciation of the stock (CEPAL, 1998a).
- 2 Including East, South and South-East Asia, Latin America and other developing regions.
- 3 The share of Latin America and the Caribbean has gone from 4 per cent to 14 per cent during this time.
- 4 In the case of Latin America, they have gone from 997 mUSD in 1990 to 22,710 mUSD in 1997 (World Bank, 1999).
- 5 MERCOSUR (MERCOSUL in Portuguese), the Southern Common Market, is a regional integration program with Brazil, Argentina, Paraguay and Uruguay as members, and Chile and Bolivia as associate members.
- 6 Import substituting policies included protectionist trade policies and policies favoring FDI in capital- and technology-intensive sectors. Protectionist trade policies can sometimes be an I advantage in large markets, favoring the establishment of local affiliates rather than exports to service a certain foreign market. Nevertheless, these regimes often limit the foreign activities to certain sectors or forms.
- 7 This applies only to manufacturing, since exports are not feasible in most service sectors, where products are non-tradable.
- 8 Trade liberalization has so far promoted expansion in the consumer and durable goods sectors, and several service sectors, as well as increased labor productivity. At the same time, imports have risen considerably faster than exports, worsening the current account imbalance. A more favorable evolution of the external sector has been hindered by an overvalued exchange rate, which has been the result of the measures to control inflation. Brazil's international competitiveness, and production in general, has also been halted by the low rates of investment in the Brazilian economy since early 1980s (EIU, 1998).
- 9 However, there could be a certain lag in the effect of the crisis on already planned investment, and the true effects of the crisis would not show in the figures available up to date.
- 10 The privatization of electricity companies has been dominated by Spanish, Chilean and US companies, while gas has been so by US companies. In telecommunications, Spain together with the US and Portugal has been the most active and in financial services it has been US, Spanish and Dutch banks.
- 11 The acquisition of local companies is considered a simple way of entering the market, and has the benefit of eliminating part of the competition and at the same time provide a market position, distribution channels, production facilities and knowledge of the local market (IDB/IRELA, 1998 & CEPAL, 1998b).
- 12 The enormous MERCOSUR market has become an important L advantage for FDI in the member countries, fueling market- and efficiency-seeking investment as foreign companies seek to access the large market, sometimes by combining production in several member countries.
- 13 According to CEPAL (1998b), five of Brazil's ten largest foreign companies are automobile companies.
- 14 It is also important to note that the rise in flows from offshore centers masks flows from countries of origin that we cannot identify.

- 15 The use of surplus capacity together with the introduction of new organizational and managerial practices, a specialization in less complex products and a reduction of local content in products has made this possible (Laplane & Sarti, 1997).
- 16 There could, for instance, be a change in L advantages at the national level, due to policy reforms, which affected all FDI and could be reflected in aggregate flows.
- 17 Root & Ahmed (1979) found both to be significant and positive, as did Schneider & Frey (1985), while Campa & Guillén (1996) also found GDP per capita to be significant. Nigh (1986) found GDP growth to be significant and positive, while Kwang & Singh (1996) found a positive but not generally significant relationship for both variables. IDB/IRELA (1993) got mixed results for GDP growth.
- 18 A potential problem with this indicator is that imports generally fluctuate greatly over the cycle, which means that this indicator may involuntarily capture cyclical effects.
- 19 At the same time, since barriers to trade may become an L advantage, low imports could in certain specific cases reflect factors which may attract FDI.
- 20 Note: Using GNP instead of GDP.
- 21 ECLAC (Economic Commission for Latin America and the Caribbean), more often referred to as CEPAL (Comisión Económica para América Latina y el Caribe), is the United Nations economic commission for the region and one of its main sources of economic analysis and data.
- 22 The Federal Reserve Bank often uses 1992 as a base year for the US GDP deflator.
- 23 GDP growth is not included since it presents negative values from some years and thus cannot be presented in logarithmic form.
- 24 The idea behind piecewise linear regression is that it divides the regression function into several parts with different slopes, but keeping the function continuous. A continuous change means that there is not a jump in the function at that point, but a change in the slope. Since the growth in FDI has been gradual, this seems to be the most likely case to have happened. A non-continuous change has also been tested with a dummy variable but the results were not significant and are not reported.
- 25 Only the test for a change in the GNP coefficient is performed, since this seems to be the most significant variable. Applying the same test to another variable instead gives a very similar result. Applying this test to all variables at a time is not possible since the different expressions of the kind $D95(X-X95)$ are near perfect collinearity.
- 26 A test was also made with GDP per capita growth but the results (not reported) were practically the same.
- 27 The ratio of exports to GNP was also tested as a possible variable, showing similar results as the ratio of exports and imports to GNP. However, it turned out to be highly correlated (negatively) with GNP.
- 28 No other typical indicators of multicollinearity are found, such as low t-ratios and high R-values. Nor does omitting one of the variables seem to affect the other significantly (not reported).
- 29 Autocorrelation means that the error terms bear a relation between different predictions. A Durbin-Watson statistic of close to 2 almost rules out the possibility of autocorrelation. Values close to 0 indicate strong positive autocorrelation while values close to 4 indicate strong negative autocorrelation (Pindyck & Rubinfeld, 1991: 137-149).
- 30 Using these variables in the models presented above gave no significant results (not reported).

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