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FINANCE AND CHANGING TRADE PATTERNS IN BRAZIL*

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I. Introduction

Balance of payments crises have been recurrent throughout Brazilian history. The depth and length of these crises depend basically on the country's vulnerability to external shocks and its capability to generate the necessary trade surplus after an adverse external shock. These, in turn, depend on trade diversification and competitiveness. With more diversified exports and imports, the country becomes less vulnerable to specific sector shocks. Increased competitiveness, furthermore, should facilitate trade balance reversals.

This paper focuses on one possible determinant of competitiveness, which is the existence of credit constraints. In a world with no missing markets, no informational asymmetries and no transaction costs, credit supply and demand should be equalized by an appropriate interest rate level, with no need for a financial sector. A vast literature, both theoretical and empirical, studies the effects on the economy when these conditions do not hold. In the real world, information asymmetries and transaction costs for acquiring information create the need for a financial system. The role of the financial sector is then, in summary, to allocate savings to the best investment projects, to monitor managers, and to diversify risk (see Levine, 1997, for a discussion on the roles of the financial system). In such an environment, financial system imperfections create credit restrictions, which in turn may affect firms' investment decisions. Hence, financial sector under-development may be harmful for growth.

Moreover, it is plausible to presume that firms in different sectors have different financial needs. Rajan and Zingales (1998) compute the external financing pattern for different industries in the United States, and they arrive at large disparities among them. If that is the case, the effect of credit restrictions should not be equal among industries. In this paper I try to identify whether Brazilian firms are credit constrained, and the relation between industries' financial needs and their competitiveness.

The period from 1974 to 1997 is studied, comprising four different situations with respect to macroeconomic environment, trade policy, and balance of payments conditions. They are briefly described below.

- *Period 1:* From 1974 to 1982 the country was suffering from the adverse trade-balance effects of the two oil shocks. Despite implementation of import restrictions and export promotion policies, a large current account deficit mounted up over the period. The economy was nevertheless growing rapidly (7% per year on average), thanks to large capital inflows.

- *Period 2:* From 1982 to 1990 the economy experienced the effects touched off by the Mexican moratorium declared in 1982. Even stronger trade barriers were imposed, and capital flows were very timid. The current account suffered a drastic reduction, from a 6% deficit in 1982 to zero balance in 1984. The economy faced major macroeconomic instability, with two digit monthly inflation rates in the late 1980's, and several unsuccessful price stabilization programs were attempted.

- *Period 3:* From 1990 to 1994 the macro-instability scenario did not change, but drastic trade liberalization was carried out. There was an upsurge of capital inflows to Brazil, following the Latin American trend.

- *Period 4:* From 1994 to 1997 macro-stability finally was achieved, together with even stronger capital inflows. Increasing current account deficits gave rise to concerns about sustainability.

This paper is divided into six sections. Section 2 describes the economic environment over the time period studied, emphasizing the four distinct periods outlined above. Section 3 analyzes trade pattern evolution in Brazil over time. Section 4 studies the extent to which Brazilian firms have been credit-constrained. Section 5 synthesizes the results from Sections 3 and 4, analyzing possible influences of finance on the evolution of trade specialization. Section 6 concludes.

II. Economic Environment

II.1 Trade Policy

Brazil has a long history of external trade intervention. After World War II, it engaged in an import substitution strategy that lasted for decades, following the trend in most Latin American countries. Import substitution meant a gradual process of industrialization based on domestic market protection and subsidies for investments in specific industrial sectors. From the mid 1960's to 1973 the country carried out slow import liberalization, combined with export promotion policies, which included frequent exchange-rate devaluations, subsidized credit, and tax and tariff exemptions for export activities. This combination of policies resulted in an important shift in the composition of exports, favoring industrial goods to the detriment of traditional coffee exports. Coffee as a share of total exports was around 40% in 1964, dropping to only 20% in 1973. The degree of diversification of imports did not achieve that of exports. Although some import substitution occurred in the intermediate and capital goods sectors, there was no substantial expansion of domestic oil production. Imports continued to be concentrated on oil and intermediate and capital goods. These are known as the 'miracle' years in Brazil. Gross national product grew at an astonishing average yearly rate of 11.1%, and annual industrial growth averaged 13.1% over the period.[2]

Period 1

Oil prices quadrupled at the end of 1973, and they would increase again in 1979. Since oil was an important part of Brazilian imports (20% in 1974), there was a severe impact on the trade balance, which changed from a modest surplus to a 4.7 billion-dollar deficit in 1974. The current account deficit deteriorated substantially, increasing from $ 1.7 billion in 1973 to $ 7.1 billion in 1974. The government chose not to depreciate the real exchange rate. Non-essential imports were discouraged, and the country borrowed internationally to level its balance of payments and ensure the country's fast growth path. A dynamic export promotion policy was then

[2] For an overview of the period from 1964 to 1973, see Bonomo and Terra (1999).

implemented to compensate for the anti-export bias created by the import restraints.[3] Average growth from 1974 to 1982 was indeed high – 6.6% average GDP growth for the period (see Table 1).[4]

Period 2

A new shock hit the economy in 1980 – the increase in international interest rates. From 1975 to 1979, the LIBOR averaged 7.8%, and world inflation[5] 8.9%. Thus, over the period real interest rates were negative on average. From 1980 to 1984, however, the LIBOR averaged 13.0% and world inflation only 1.2%. As most of Brazilian external debt was at floating interest rates, debt service increased substantially. The 1982 Mexican moratorium induced a capital flow reversal from Latin America. The increasing current account deficits could no longer be financed by capital inflows, so that a large trade surplus would have to be generated to provide foreign reserves to pay the debt service, and thereby equilibrate the current accounts (see Table 1). A rapid trade surplus was achieved by further import repression[6] and active export promotion policies. An industrial policy was also conducted, granting fiscal incentives and subsidized credit from the state development bank to selected firms.

Although a restrictive trade policy had been in place in Brazil for decades, its justification changed over time, in three distinct phases. First, from World War II to early the 1970's it was part of an active import substitution program. Then, from the early 1970's to early 1980's, the intent was to improve the deteriorating trade balance due to the oil shocks. Finally, from the early 1980's to 1990, it served as a drastic measure to deal with the debt crisis. Trade policy during the first phase was designed

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[3] BEFIEX (Comissão para a Concessão de Benefícios Fiscais a Programas Especiais de Exportação) coordinated export incentives. Long term (usually 10-year) contracts were signed between BEFIEX and the exporting firm, in which the firm would commit to a certain amount of exports over the period, and in exchange it would have reduced import duties and taxes. The program was effective – during the 1975 to 1990 period exports grew over 7% a year on average, accompanied by impressive diversification.

[4] For further details, see Simonsen (1988).

[5] World inflation is measured here as the rate of increase in world export prices in dollars.

[6] Among other measures, the government created the 'Law of Similar National Products', determining that a product could not be imported if there existed a similar good being produced domestically.

as an incentive to selected sectors, whereas in the other two phases, and especially in the third, trade policies in the form of both tariff and non-tariff barriers were created due to the macroeconomic instability.[7]

The effect of these policies on relative prices distorted microeconomic incentives. By the end of the 1980's a maze of incentives and disincentives was in place. It is important to emphasize the harm of such a distorted and arbitrary system. It was prone to stimulate rent seeking activities, drawing resources to the unproductive activity of seeking special treatment. It also displaced entrepreneurial effort from productive activities to seeking the best path through the maze of policy incentives.

Periods 3 and 4

A much-needed trade liberalization process was initiated by a new government in 1990. The BEFIEX program was immediately terminated (no new contracts were to be signed). Trade liberalization was to be carried out in three steps:

(i) the abolition of all 'special regimes' for imports;

(ii) the abolition of all quantitative restrictions and their replacement by tariffs; and

(iii) the lowering of tariffs, according to a preannounced schedule to be conducted over 4 years. By the end of the liberalization process in 1995, all tariffs would be in the range 0%-40%, averaging 20%.

Trade liberalization was carried out as planned. Import levels did not increase during the 1990-1993 period, despite the lowering of tariffs and elimination of quantitative import restrictions. Two factors contributed to this: the real exchange-rate devaluation during 1990-1991 (between January 1990 and December 1992 the real devaluation amounted to 36%), and the low economic activity during the period (the average GDP growth rate was negative 2%).

Brazil, as other Latin American countries, experienced a capital inflow upsurge in the 1990's. There was a substantial capital inflow increase after the implementation of the Real Plan, a successful price stabilization program introduced in July 1994. Real exchange-rate appreciation resulted, producing a mounting current account deficit,

[7] See Bonelli, Fritsch and Franco (1993).

now led by a steep increase in imports. The reliability on capital inflows was severely questioned after the Mexican crisis in December 1994. This led to a partial reversal in trade liberalization. Some quantitative restrictions were temporarily reintroduced, and tariffs were increased for those products most responsible for increased imports.

II.2 Real Exchange Rate, Trade Flows, and the Current Account

Figure 1 shows the evolution of the real exchange rate and its volatility[8], and Figure 2 the current account, imports and exports as a percentage of GDP from 1974 to 1996. The charts are divided into the four sub-periods described above.

Period 1

During the first period, the real exchange rate (RER) appreciated more than in the other periods. The crawling-peg exchange rate regime maintained low RER volatility, except for the maxi-devaluation episode in 1979. Imports, which had increased substantially after the oil price increase, decreased steadily until 1979 due to a restrictive trade policy. The second oil price increase caused the trade balance to deteriorate, leading to the currency maxi-devaluation in 1979. Figure 2 shows the jump in export share after the devaluation (it increased from an average of 6.8% of GDP during 1973-1979 to 8.5% in 1980). The current account was negative throughout the period, reaching negative 6% of GDP in 1982, despite the trade balance surplus in that year. The current account deficit was caused by the high debt service cost, due to the increase in international interest rates. The country nevertheless experienced high GDP growth rates over the period (see Table 1).

Period 2

There was a sharp RER devaluation during the debt crisis, accompanied by higher volatility. The RER volatility increased over the period, reaching its peak in 1990. The period was characterized by deep macroeconomic instability. As shown in Table 1, inflation reached extremely high rates. Several heterodox price stabilization

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[8] Real exchange rate volatility is measured as the monthly real exchange rate standard deviation for a 12-month period. The measure is centered, i.e., the measure for June corresponds to the standard deviation from January to December. The real exchange rate was measured as $RER = (e.WPI)/CPI$, where e is the nominal exchange rate published by the Brazilian Central Bank, WPI^* is the U.S. wholesale price index, and CPI is the Brazilian consumer price index (INPC series from IBGE).

attempts managed to reduce inflation from two-digit monthly figures to zero in a very short period of time, only for it to take off again after failure of the plans. Not even the crawling peg regime pursued was capable of preventing high RER volatility.

The more devalued RER was accompanied by a substantial trade balance improvement, led mainly by increasing exports, as shown in Figure 2. The current account moved from negative 6% of GDP in 1982 to a near zero balance over the whole period. The investment rate decreased during the period. The sharp balance of payments adjustment was accompanied by bitter recession: GDP decreased 4.2% and 2.9% in 1982 and 1984, respectively. High growth rates were experienced from 1985 to 1987, but they decreased again towards the end of the decade.

Period 3

The third period started with very high RER volatility, during a short period of RER appreciation. The RER depreciated again, but to a lower level compared with the second period, while RER volatility decreased substantially. The current account maintained its near zero balance, while imports started an upward trend, following the 1990's trade liberalization. GDP growth rates were near zero or negative over the period.

Period 4

The nominal exchange rate was allowed to float during the first months after the Real Plan's implementation in June 1994, causing a RER volatility increase. The capital inflow during the period caused the exchange rate to rise, leading to a higher imports. The current account moved from a zero balance at the beginning of the period to a 3.2% deficit in 1996. Annual growth rates were between 4 and 6% during 1994-1996, but in 1997 growth declined to 2.7%.

III Trade pattern evolution

This section analyses the pattern of trade since 1974, using several indexes that characterize trade patterns.

Contribution to Trade Balance

The first index used to characterize trade patterns in Brazil is the contribution to trade balance (CTB) index. Table 3 presents the performance of this index from 1974 to

1997, in a 10-sector aggregation.[9] The index of contribution of industry i to trade balance was calculated using the following equation:

$$CTB_i = \frac{2}{(X+M)}\left[(X_i - M_i) - \frac{(X_i + M_i)(X - M)}{(X+M)}\right],$$

where X_i and M_i are exports and imports of industry i, respectively, and X and M are total Brazilian exports and imports, respectively.

The first term of the index represents net exports (by sector), whereas the second represents 'neutral' net exports, that is, net exports (by sector) that would be observed if the share of each product in overall net exports were equal to its contribution to total trade. Thus, the index value equals zero for a given period when the ratio of the net sector exports to overall net exports is equal to the sector's contribution to total trade. Its value will be positive or negative depending on whether net exports are larger or smaller relative to the 'neutral' value. Note that if a country is running a trade deficit, a product may show a positive sign even if its imports are larger than its exports. The opposite is true for a trade surplus.

Figures 3.a and 3.b show the index evolution for each of the 10 industries. Note that the industries in Figure 3.a have a much stronger contribution to trade balance than those of Figure 3.b: the scale in Figure 3.a ranges from –0.6 to +0.6, whereas in Figure 3.b it ranges from only –0.1 to +0.1. Lines have been drawn on the years corresponding to the periodicity used above.

There were important changes in the composition of imports and exports over the period. The Food and Beverages sector presented the largest CTB decrease in absolute terms over the period. Its CTB fell from 0.50 in 1974 to 0.22 in 1997, representing a 54% decrease. This shows the increasing importance of other industries in Brazilian exports over the period. The strongest change occurred between the first and the second periods (the oil shock and debt crisis periods), when the Food and Beverages CTB decreased from an average of 0.43 to 0.22. After the

[9] FUNCEX provided by monthly sector data for imports and exports.

Real Stabilization Plan, it increased slightly. Food and Beverages remains the sector with highest CTB.

Energy Material, on the other hand, presented the largest swing in CTB. Over the first period (oil crisis), Energy Material CTB decreased from –0.26 in 1974 to –0.46 in 1983. From 1983, on the other hand, it increased to –0.12 in 1997. This movement reflects the decreasing importance of oil in Brazilian imports. In 1974 this sector had the lowest CTB, and in 1997 had it given up its last position to Machinery (which was second to last in 1974).

In percentage terms, the sectors which underwent the largest changes in CTB were Wood, Paper and Products and Metal Products, increasing 285% and 291%, respectively.

Transport Equipment CTB decreased steeply over the last period. Its value increased during the first period, from –0.0191 in 1974 to +0.0593 in 1982. During the second period its value averaged 0.0312, thereupon falling from 1992 to its lowest value of –0.433 in 1995.

Both exports and imports became more diversified over the period. The index variance across sectors ranged from 0.038 to 0.052 in the 70's and early 80's. It started decreasing steadily in 1983, and its value has been around 0.013 in the past few years.[10] This means that the index has become more uniformly distributed across sectors over time. Hence, exports and imports have become less concentrated in specific sectors.

Revealed Comparative Advantage

The other index used to assess each sector's role in inter-industry trade is Balassa's index of revealed comparative advantage (RCA). This index measures the relative importance of a sector in a country's total exports with respect to the relative importance of that sector in world total exports. It is given by:

[10] Looking at the CTB index for a 23-industry aggregation, its variance ranged from 0.0061 to 0.0115 in the 1970's and early 1980's, going down to around 0.002 for the past few years.

$$RCA_{ij} = \frac{\left(X_{ij} / X_j\right)}{\left(X_{iW} / X_W\right)},$$

where X_{ij} is country *j*'s exports by industry *i*, X_j is country *j*'s total exports, X_{iW} is world exports by industry *i*, and X_W is total world exports.

The evolution of RCA indexes are shown in Table 3. The index has been calculated for the period from 1986 to 1997, for 10 aggregated sectors.

The largest movement occurred in the Wood, Paper and Products sector. Its RCA increased 85% over the period (from 1.16 to 2.15). The CTB of that industry increased 42% over the same period, indicating that its increased importance in Brazilian exports surpassed the increase of the sector's importance in world exports. Other significant changes are a 22% decrease in Textile, Apparel and Footwear, also following its decrease in CTB, and a 22% and 29% increase in Transport Equipment and Construction Material, despite those sectors' decrease in CTB.

The sectors presenting the highest RCA in 1997 are Food and Beverages (3.15), Metal Products (2.82), and Wood, Paper and Products (2.15). The lowest ones are Machinery (0.31) and Chemical Products (0.43).

Intra-Industry Trade

The Grubel & Lloyd intra-industry trade measure, presented in Table 4, is calculated as:

$$B_i = \frac{(X_i + M_i) - |X_i - M_i|}{(X_i + M_i)}, \text{ and}$$

its aggregate values, shown in the last column of Table 4, as:

$$B = \frac{\sum (X + M) - \sum |X - M|}{\sum (X + M)}.$$

The aggregate index shows a steady increase over time. As for the index's evolution for the different industries, it increases for most of them. The most spectacular increase was in the Textile, Apparel and Footwear industry. The Grubel & Lloyd

index started at 29% in 1974, decreased until reaching its lowest level of 12% in 1981, and then increased until reaching 82% in 1995. For Metal Products, on the other hand, the index decreased substantially.[11] As the performance of the index indicates, the advent of Mercosur had a positive effect on intra-industry trade levels.

IV. Liquidity Constraints, Finance Pattern, and Corporate Investment

This section studies Brazilian companies' financing decisions, and the extent to which they have been financially constrained. The empirical investigation uses balance sheet data for firms that are required by law to publish them. The data were collected by IBRE (Instituto Brasileiro de Economia, Getúlio Vargas Foundation) from the *Gazeta Mercantil* and *Diário Oficial*, from 1986 to 1997, with the number of firms each year ranging from 2,091 to 4,198. From the original sample, I selected those firms which had data published for all years considered[12] – from 1986 to 1997 – a total of 550 firms. Non-industrial firms were excluded, as well as those with missing data. The sample used is composed of 468 firms, broken down by sector as follows:

Sector	Number of Firms	Average value of assets* (1994 to 1997)
Apparel and Footwear	16	151,226,212
Beverages	15	599,900,102
Chemical Products	71	814,435,409
Drugs	11	137,409,771
Electric Equipment	28	338,754,575
Food Products	70	170,390,346
Furniture	4	35,992,189
Leather	3	19,429,112
Machinery	38	176,597,031
Metal Products	60	606,166,766
Non-metal Products	30	371,050,142
Other Industries	9	92,482,669
Paper and Products	19	857,736,540

[11] The Aquino intra-industry trade index has also been calculated, and the results are similar to the ones reported here for the Grubel & Lloyd index.

[12] This procedure may bias the sample of firms used, but I argue that the bias should not favor the result I am investigating. We are trying to identify whether firms are credit-constrained. It is plausible to believe that firms which survived throughout the period studied should not be the more credit-constrained ones. Hence, if this (possibly) biased sample presents credit constraints, the unbiased sample should also be credit-constrained.

Perfumery and Soap	3	24,547,019
Plastic Products	8	74,543,359
Printing and Publishing	11	97,283,390
Rubber Products	1	17,969,577
Textiles	40	121,148,883
Tobacco	1	409,941,742
Transport Equipment	23	256,891,434
Wood Products	7	252,427,396

* In 1996 constant Reais.

The data has two breaks over time, one in 1990 and the other in 1994, due to changes in balance sheet reporting criteria after the implementation of inflation stabilization plans (the Collor Plan in 1990, and the Real Plan in 1994). All the analyses are carried out taking into account those two breaks in the time series.

The time frame for which we have firms' level data is shorter, including only three of the four periods described earlier. The analysis in this section will therefore divide the period from 1986 to 1997 into three sub-periods: the macro instability and balance of payments crisis period (1986-1990), the macro instability and trade liberalization period (1990-1994), and the macro stability and capital inflow period (1994-1997).

IV.1 Pattern of finance

The analysis starts with a description of the firms' patterns of finance. The set of firms is divided into sub-categories, trying to identify possible differences in finance patterns across different groupings, or across different time periods. Two leverage measures are calculated: the ratio between liabilities and assets, and the ratio between debts[13] and assets. Figure 4 presents both measures' evolution for the whole sample of firm averages, and Table 5 presents the averages across periods. Over the first period, liabilities and debts were stable in relation to total asset ratios, averaging 35% and 11%, respectively. There was a slight increase in both measures during the second period. Firms were clearly becoming more leveraged over the last period, 1994-1997, when liabilities averaged 47% and debts 16% of total assets.

[13] The measure for debt is the long- and short-term loans on the firm's balance sheet. Liabilities include all other accounts under liabilities, such as dividends and taxes to be paid.

First, the sample of firms is divided into subgroups based on an a priori hypothesis with respect to firms' credit accessibility. It is reasonable to assume that larger firms would have more access to credit markets than smaller ones. As Gertler and Gilchrist (1994, p.313) argue, "while size per se may not be a direct determinant [of capital market access], it is strongly correlated with the primitive factors that do matter. The informational frictions that add to the costs of external finance apply mainly to younger firms, firms with a high degree of idiosyncratic risk, and firms that are not well collateralized. ... These are, on average, smaller firms." The finance pattern evolution for those two groups of firms is indeed interesting, as shown in Figures 5a and 5b. Although leverage measured as liabilities as a share of total assets does not differ between the two groups of firms, the debts to assets ratio is quite different between them. Large firms have a higher debts to assets ratio throughout the whole time frame, compared to small firms.

There are two possible explanations for the higher indebtedness of large firms compared to that of small firms. Low debt for small firms may be either the result of pure financial decisions or an indication of the credit restrictions they face. If the first alternative is true, some firms simply chose to use fewer external loans, and those are coincidentally the small ones. If the latter is true, a group of firms was credit-restricted, and therefore it was not possible for them to be more leveraged. The empirical exercise performed in the next sub-section tries to identify which explanation is more consistent with the data.

Rajan and Zingales (1998) construct a measure of external dependence for different industries, using data on external finance for U.S. industries. They assume that there is a technological reason for some industries to depend more on external finance than others. They argue that "to the extent that the initial project scale, the gestation period, the cash harvest period, and the requirement for continuing investment differ substantially between industries, this is indeed plausible. Furthermore, we assume that these technological differences persist across countries, so that we can use an industry's dependence on external funds as identified in the United States as a measure of its dependence in other countries." (Rajan and Zingales, 1998, p.563) By using the measure constructed in that paper, which is reproduced below, firms also have been divided according to their external dependence: firms in the sectors

exhibiting more external dependence have been separated from those firms in sectors presenting less finance dependence.[14] It is interesting to note that in Brazil, as Figure 6.a shows, more financially dependent firms are on average more leveraged than less financially dependent firms, looking at the ratio of liabilities to assets[15]. That is, firms more in need of external finance according to the external dependence measure exhibit greater use of external finance. With respect to the debts to assets ratio, there is no pattern for the difference between these two groups: in some periods firms in less dependent sectors have a higher debts to assets ratio, compared to more dependent ones; in other periods they have a lower measure (Figure 6.b).

External Dependence

Apparel and Footwear	0.03
Beverages	0.08
Chemical Products	0.25
Drugs	1.49
Electric Equipment	0.77
Food Products	0.14
Furniture	0.24
Leather	-0.14
Machinery	0.45
Metal Products	0.24
Non-Metal Products	0.06
Other Industries	0.47
Paper and Products	0.18
Perfumery and Soap	0.47
Plastic Products	1.14
Printing and Publishing	0.20
Rubber Products	0.23
Textile	0.40
Tobacco	-0.45
Transport Equipment	0.31
Wood Products	0.28

Source: Rajan and Zingales (1998)

Finally, the sample of firms is divided between multinational and domestic firms. The motivation for this division is that multinational firms may have more access to

[14] Firms which are less dependent on external finance are those in the following sectors: Furniture, Chemical Products, Wood Products, Transport Equipment, Textiles, Machinery, Perfumery and Soap, Electric Equipment, Plastic Products, Drugs; and Other Industries.

[15] Note that Rajan and Zingales external dependence measure refers to all sorts of external financing, not only loans.

international credit markets, and therefore be less credit-constrained. In both leverage measures, Figures 7.a and 7.b show higher leverage for multinational firms until 1993, and higher leverage for domestic firms since then.

IV.2 Credit constraints

There is an ample literature that seeks empirical evidence of credit constraints by looking at the firm's investment decision. Fazzari, Hubbard and Petersen (1988) was the first of several papers to estimate models of investment demand, including cash flow, as an independent variable. The reasoning is that if firms are not credit-constrained, their cash-flow variations should not affect investment decisions, after investment opportunities are controlled for. The general form for the investment equations they estimate is:

$$(I/K)_{it} = f(X) + g(CF/K)_{it} + u_{it},$$

where I_{it} and K_{it} represent investment and capital stock of firm i at time t, X represents a vector of variables affecting firms' investment decisions, according to theoretical considerations, and u_{it} is an error term. In some specifications, the Q investment model is estimated by using Tobin's q as the vector *X*, and including the cash-flow variable in the equation. In other specifications, the accelerator model of investment is used, and the *X* vector is replaced by contemporaneous and lagged sales to capital ratios.

Using a different method, Whited (1992) estimates Euler equations for an optimizing investment model under two different assumptions: when firms are credit-constrained, and when they are not. Gertler and Gilchrist (1994), on the other hand, study whether small and large firms respond differently to monetary policy. They find that smaller firms have a much stronger response to monetary tightening than larger firms, indicating they are more credit-constrained. All these studies use data for U.S. firms.

The accelerator model specification from Fazzari, Hubbard and Petersen (1988) will be reproduced for Brazilian data to identify the existence (or not) of credit

constraints.[16] The empirical exercises performed here are based on the sales accelerator investment demand model, where investment is explained by current and past sales. Cash flow is included as an explanatory variable for investment, as shown in the equation:

$$(I/K)_{it} = b_i + b_0(S/K)_{it} + b_1(S/K)_{i,t-1} + b_2(S/K)_{i,t-2} + a(CF/K)_{it} + u_{it},$$

where S_{it} represents the sales of firm *i* at time *t*. Cash flow should not be a significant explanatory variable for investment, except when firms are credit-constrained. That is, the parameter a should not be significant for firms that are not credit-constrained, and it should be positive and significant for credit-constrained firms.

Table 6 presents the initial results. All regressions include firm-specific effects[17], and two dummies: one for 1990 and another for 1994, to account for the breaks in the data. First, the investment accelerator model is estimated without including cash flow as an explanatory variable. The best specification for our data is the one including two lags of the sales variable. As column 1 of Table 6 shows, variations in the sales variables explain 52% of investment changes. When cash flow is included in the regression, independent variables explain 81% of investment variations, and cash flow has a positive and significant coefficient (with t-statistics of 10.1). According to our conjecture, this is an indication that firms were credit-constrained over the time period studied.

One should note, however, that the period under study encompasses two distinct situations with respect to capital inflows. From 1986 to 1994 there was very little external capital inflow into Brazil, and from 1994 to 1997 current account deficits increased substantially, reaching 4% in 1997, as shown in Table 1. It is possible that the higher capital inflow increased the credit supply, therefore lessening firms' credit constraints. A slope dummy for cash flow for the period 1994-1997 has been

[16] It is very difficult to replicate Whited (1992) for Brazilian data, due to a lack of data on some crucial variables. For the same reason, is also not possible to replicate the Q model of investment used in Fazzari, Hubbard and Petersen (1988).

[17] All regressions were also estimated in first differences, and the results were qualitatively similar to the ones reported here.

included in the regression. This variable equals cash flow and capital ratio for the years 1994 to 1997, and is zero for the rest of the period. If firms were less credit-constrained over 1994-1997, this slope dummy should not be positive. That is not the case though. The slope dummy coefficient is positive, with a t-statistic of 1.93. Thus, there is no evidence that firms became less credit-constrained with the external capital inflow.

The next step is to investigate possible differences in credit constraint across groups of firms. First, as argued in the previous subsection, it is reasonable to expect that small firms are more credit-constrained than large ones. The sample is then split according to firms' size,[18] and the regression results are presented in columns 4 to 7. Cash flow coefficients are also positive and significant for both groups of firms (columns 4 and 6). Hence, there is no evidence that larger firms are less credit-constrained than are smaller firms.[19]

Second, international credit markets may be more accessible for multinational firms, compared to domestic ones. Columns 1 to 4 in Table 7 present the results for the regressions estimated for multinational and domestic firms separately. Again, all cash-flow coefficients are positive and significant, indicating credit constraints for both groups. There is an important difference in the cash-flow slope dummy in the period 1994-1997 for the two groups, though: for domestic firms, this coefficient is positive and significant, and for multinationals it is negative, with a t-statistic of –1.238. This can be interpreted as an indication that multinational firms were less credit-constrained over the period 1994-1997, when there was a large capital inflow.

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[18] Instead of splitting the sample into sub-groups, another specification is also used, which will be denoted here as "slope dummy specification". In this specification, slope dummies are included in the regression with the whole sample of firms, which was equal to cash flow for the alternative groupings of firms, and zero otherwise. These slope dummies should capture differences in the cash flow coefficient for the different groups of firms. The same qualitative results were obtained.

[19] As a further result, in the slope dummy specification, the slope dummy for large firms is not significantly different from zero. Therefore, the null hypothesis that the cash flow coefficient is equal for the two groups of firms cannot be rejected.

Hence, the capital inflow seems to have lessened only multinational firms' credit constraint.[20]

The sample has also been divided according to external dependence, using Rajan's and Zingales' (1998) measure, and the estimated regressions are presented in Table 7, columns 5 to 8. The cash-flow coefficients are significant in all regressions, but the coefficient is higher for less-dependent firms. One interpretation is that less-dependent firms would use less external finance, therefore their investment would be more cash-flow sensitive. The cash-flow slope dummy is positive, but not significant for both sub-samples.

The results so far indicate credit restrictions across the whole sample of firms, and also across sub-groups formed by larger and smaller, more and less externally dependent, multinational and domestic firms. The only instance of credit-constraint reduction was among multinational firms, from 1994 to 1997.[21]

Further results

Kaplan and Zingales (1997) argue that investment-cash-flow sensitivities do not provide a useful measure of finance constraints, introducing controversy regarding the validity of this methodology. An alternative empirical exercise is then performed, without the use of cash flows. It was motivated by Rajan and Zingales (1998).

Rajan and Zingales (1998) investigate the effect of financial sector development on industrial growth. Their main hypothesis is that "industries that are more dependent on external financing will have relatively higher growth rates in countries that have more developed financial markets" (p. 562). They use industry-level data for several countries to estimate an equation where industry growth is explained by the interaction between an industry's external dependence and the country's financial development, controlling for country indicators, industry indicators, and that industry's share in the country's economy. That is, they have an equation which tries to capture possible variables that explain differences in industry growth rates in

[20] In both other specifications – slope dummies and first differences – the slope dummy coefficient for 1994-1997 is negative *and* significant for the group of multinational firms.

[21] All regressions were also run including only one and three lags for sales, and the results were unchanged.

different countries, and they include a new variable in the equation, namely external dependence times financial development. Their conjecture is that if financial development is indeed important for growth, the coefficient of this interaction variable should be positive: more dependent industries would tend to grow faster in a more financially developed environment.

I borrow this idea from Rajan and Zingales (1998) in the following way. It seems plausible to take Brazil as a financially constrained economy. As shown in Table 8, Brazil has low domestic credit as a proportion of GDP compared to developed countries. In this financially constrained environment, more dependent firms that have access to credit should be relatively better off. Less dependent firms, on the other hand, should not be much affected by credit access. Hence, when explaining cross-firm investment levels, more dependent firms would tend to invest more when they have more access to credit, in a credit-constrained environment.

The empirical implementation is carried out by estimating the investment accelerator model, including the interaction between external dependence and credit access. Firm size is used as a proxy for credit access. If Brazil has a credit-constrained economy, and if firm size is a good proxy for credit access, the coefficient for the dependence and firm size interaction term should be positive. Table 9 presents the results. The estimated regression for the whole sample of firms is presented in column 1. The coefficient for the interaction term is indeed positive and statistically significant: more dependent and larger firms do invest more.

In this empirical specification, it makes no sense to divide the sample of firms into large and small, or more and less dependent, because the criteria used for such divisions is already contained in the new independent variable used. An alternative grouping of firms is used, based on asset growth. One group, denoted “winners”, is composed of those firms which presented an above average asset growth rate over the period, and the other group, “losers”, is composed of firms with asset growth rate below average. The interaction term (external dependence times firm size) is positive and significant in both sub-groups, as shown in columns 2 and 3. It is interesting to

note, though, that the coefficient is more than four times larger for the group of loser firms.[22]

V. Credit Constraints and Trade Patterns

Section III describes industrial trade pattern evolution in Brazil, and Section IV investigates the extent of credit constraint faced by Brazilian firms. In this section I try to interact these two analyses in order to extract some evidence of the working of credit constraint as one of the sources of comparative advantage.

I divide time into the four sub-intervals used in previous sections: oil crisis (1974-1982), debt crisis (1982-1990), trade liberalization (1990-1994), and capital inflow (1994-1997). Trade barriers increased over the first two periods, and started being removed in late 1980's. Trade pattern evolution over the first two periods would not necessarily represent the response to comparative advantages, but rather to distorted incentives. During the last two periods, on the other hand, trade distortion diminished substantially, and trade-pattern evolution can be taken as an expression of the countries' comparative advantages.

Contribution to Trade Balance averages are calculated for each sub-interval, identifying whether they are significantly different across sub-intervals, at a 5% significance level. The results are presented in Table 10. *Winners* are sectors which significantly increased their CTB from one period to the next; *losers* those significantly decreasing their CTB; and s*tagnant* the ones that showed no significant change. The most interesting features of the pattern observed in Table 10 are the following.

- Machinery is a winner from the first to the second periods only, that is, under trade distortions. It is a loser from the second to the third, and stagnant from the third to fourth.
- Drugs, Plastic Products and Electric Equipment follow a similar pattern. They are stagnant from the first to second periods, and losers over the other periods.

[22] All cash-flow regressions were also estimated for the groups of winner and loser firms separately, but no difference between them was identified in those regressions.

- The opposite is true for the sectors Wood Products, Furniture, Leather, and Tobacco. These sectors are losers from the first to the second periods (except Tobacco, which was stagnant), and they are winners through the other periods.
- Food Products, Metal Products and Rubber Products are also interesting cases: the first is a losing sector across all periods, except from third to fourth, and the opposite is true for the other two sectors.
- Textiles is a losing sector in all periods.

It is reasonable to conclude that Brazil shows no comparative advantage in Machinery, Drugs, Electric Equipment and Textiles, and shows comparative advantage in Wood Products, Furniture, Leather, and Tobacco. Our main question is whether finance was one of the sources of this comparative advantage. Looking at the external dependence measure, it is interesting to note that the four sectors with lack of comparative advantage are among the seven most externally dependent ones. Tobacco and Leather, on the other hand, are the two least externally dependent – actually, they have negative measures of external dependence.

For a statistical comparison of the two measures – CTB and external dependence – the correlation between the two is calculated for each year, and the results presented in Table 11. Not only is the correlation between CTB and external dependence negative, but it also decreases over time. This means that, on average, more externally dependent industries have lower CTB measures, and this negative relation is stronger over time.

VI. Conclusion

This paper has sought to investigate whether credit constraints may have influenced trade pattern evolution in Brazil. The analysis started with a description of economic development over the time period studied – 1974 to 1997. The Brazilian economy suffered several large external shocks over the period, leading, along with other factors, to major macroeconomic disturbances. Macroeconomic volatility was extremely high over the 1980's and early 1990's. Since the implementation of the Real Plan in mid-1994, the country has experienced relative macroeconomic stability. Trade policy was characterized by two main situations: severely restrictive trade policy until the late 1980's, and more liberalized trade in the 1990's.

Trade pattern evolution was described through a series of indexes, and they identified a clear trade diversification in the course of the time period studied. Notably, the sector Food and Beverages represented a very important export sector at the beginning of the period, and its importance thereupon decreased substantially. An interesting feature of trade-pattern evolution is the reversal in some sectors' Contribution to Trade Balance after trade liberalization in the 1990's. Some sectors, such as Machinery, Drugs, Plastic Products and Electric Equipment, presented increasing (or non-decreasing) trade balance contributions over the restricted trade period, and decreasing contributions after liberalization. The opposite is true for some other sectors, such as Wood Products, Furniture, Leather and Tobacco.

Credit constraints were investigated using firm's balance sheet data. The empirical exercise tried to answer two questions: whether firms are credit-constrained, and whether credit constraints differ among different groups of firms. Following an influential trend in the empirical literature in this area, an investment accelerator model was estimated, including cash flow as an explanatory variable. If firms are not credit-constrained, the cash-flow coefficient should not be a significant, once investment determinants are controlled for. Estimated results indicated that Brazilian firms are indeed credit-constrained. The only instance in which credit constraints seemed softer was among multinational firms, during the period 1994-1997.

After describing trade pattern evolution, and establishing that Brazilian firms are credit-constrained, the concluding question is: Is there a link between credit constraint and trade pattern? The link is investigated by comparing the contribution to trade balance index to sectoral external dependence. External dependence is a measure constructed by Rajan and Zingales (1998), which indicates the amount of external finance an industry would use in an environment with no credit restrictions. Contribution to trade balance and external dependence are negatively correlated, that is, in any given year, sectors with higher CTB are the ones with lower external dependence on average. It is interesting to note that the negative correlation becomes stronger over time, especially after trade liberalization, when trade started to reveal the economy's comparative advantages with less artificial distortions. This is an indication that sectors less in need of external financing would be relatively better off

in Brazil, which we identified as a credit-restricted economy. Thus, credit restrictions may be a source of comparative advantage.

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Figure 1

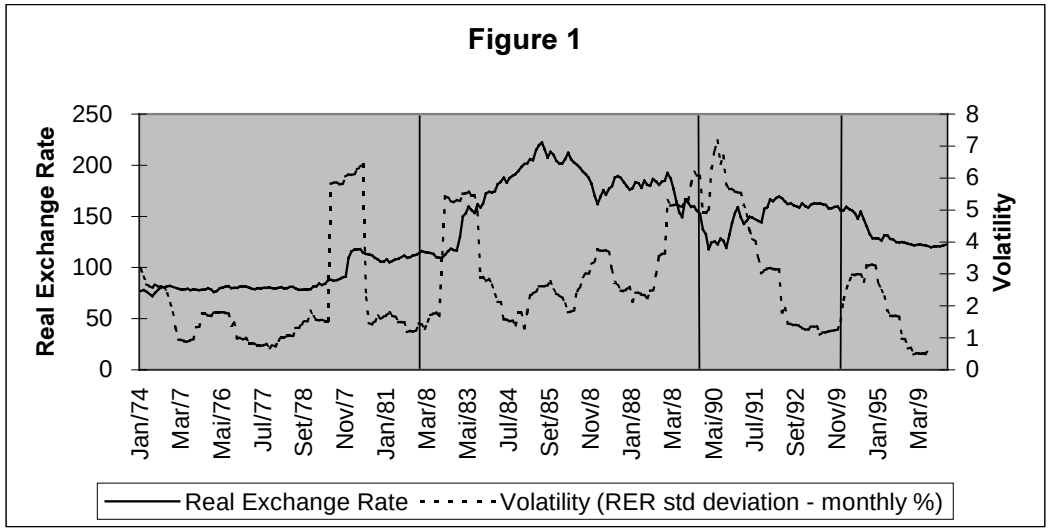


Figure 2

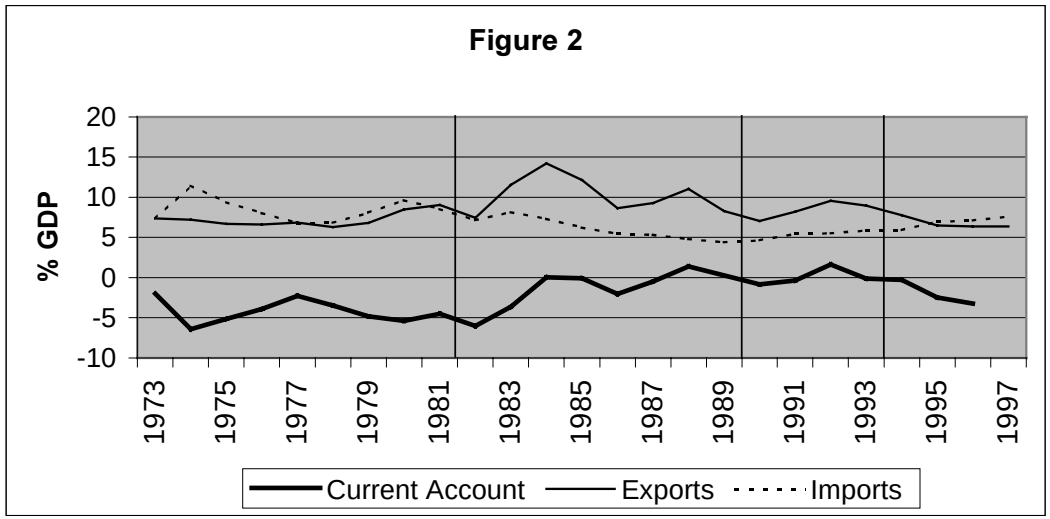


Figure 3a: Contribution to Trade Balance

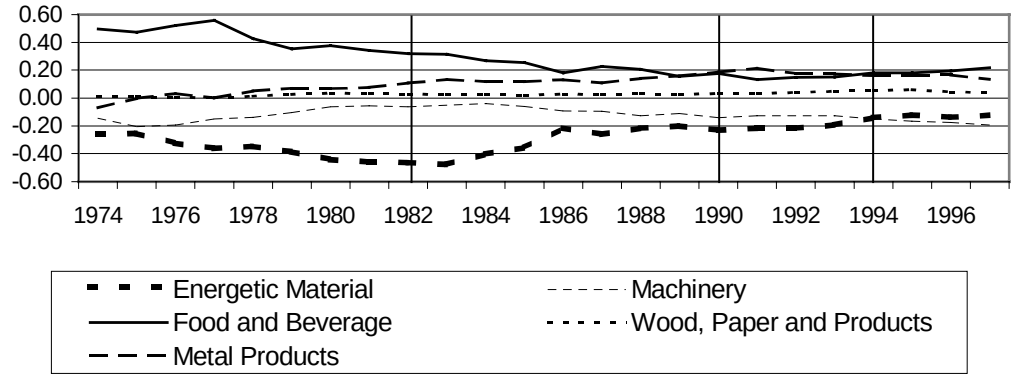
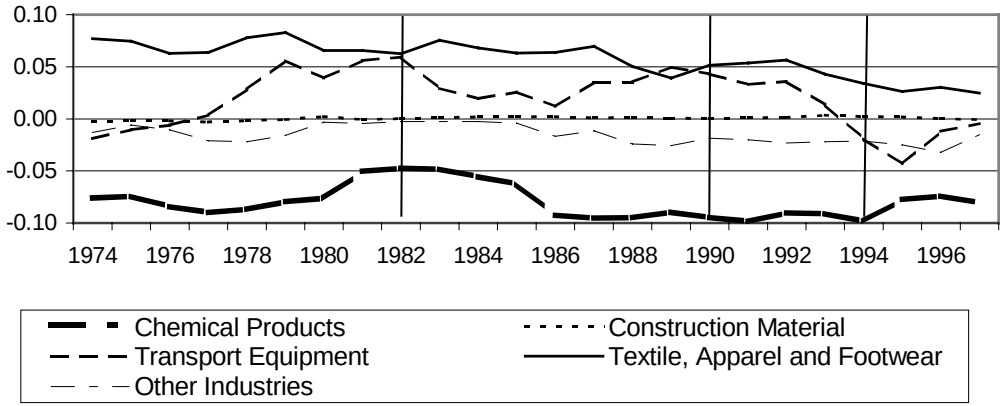


Figure 3b: Contribution to Trade Balance



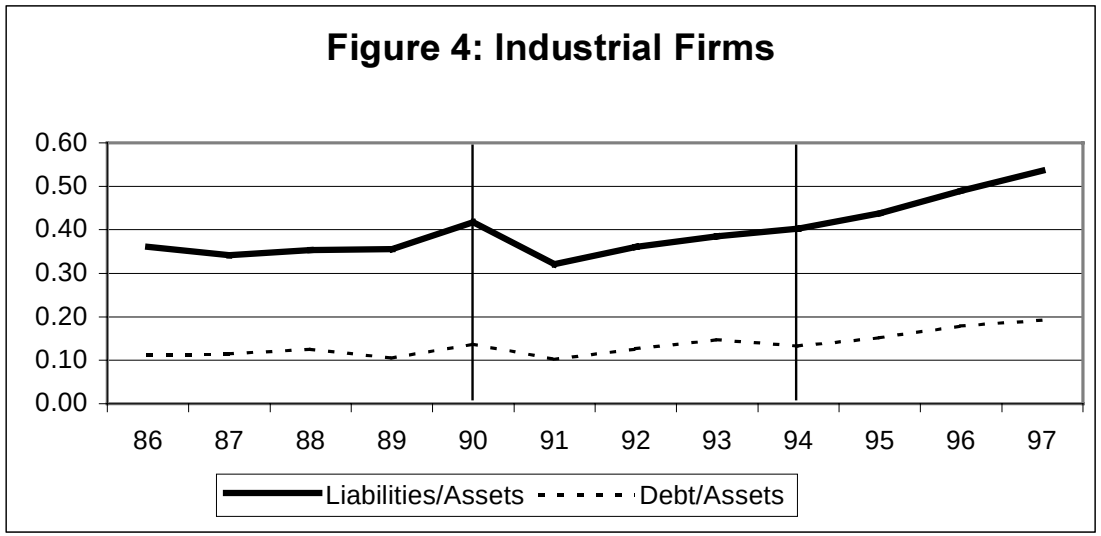
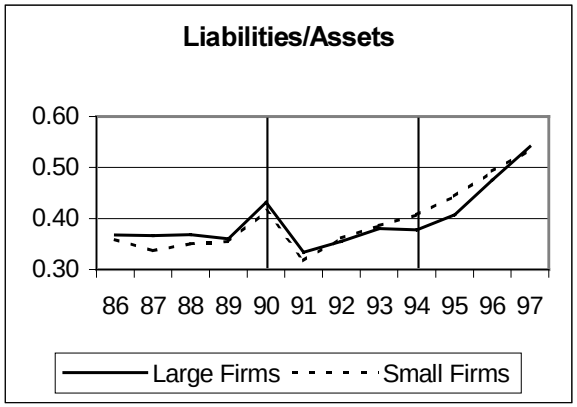
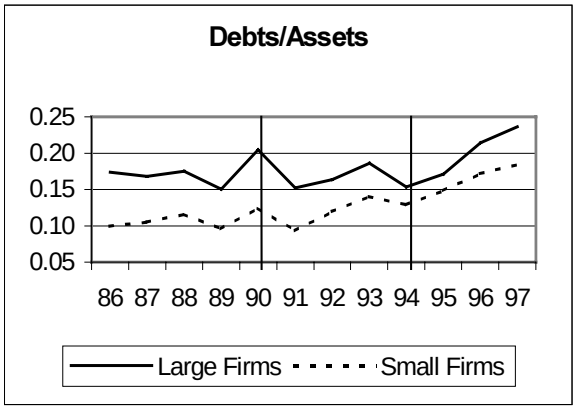


Figure 4: Industrial Firms
0.60
0.50
0.40
0.30
0.20
0.10
0.00
86 87 88 89 90 91 92 93 94 95 96 97
Liabilities/Assets
Debt/Assets

Figure 5

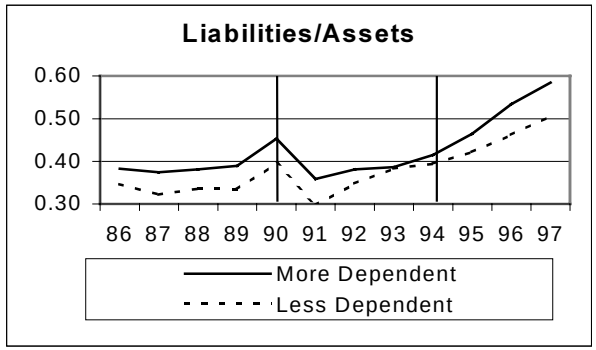

Liabilities/Assets
0.60
0.50
0.40
0.30
86 87 88 89 90 91 92 93 94 95 96 97
Large Firms
Small Firms

(a)


Debts/Assets
0.25
0.20
0.15
0.10
0.05
86 87 88 89 90 91 92 93 94 95 96 97
Large Firms
Small Firms

(b)

Figure 6



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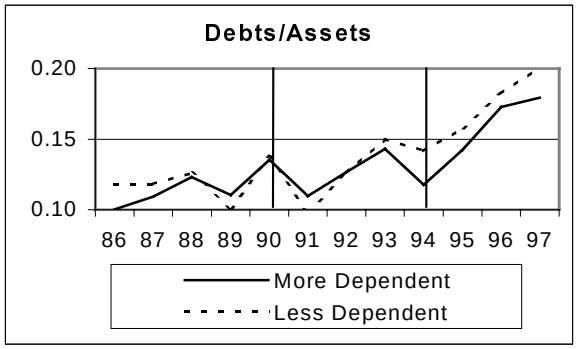
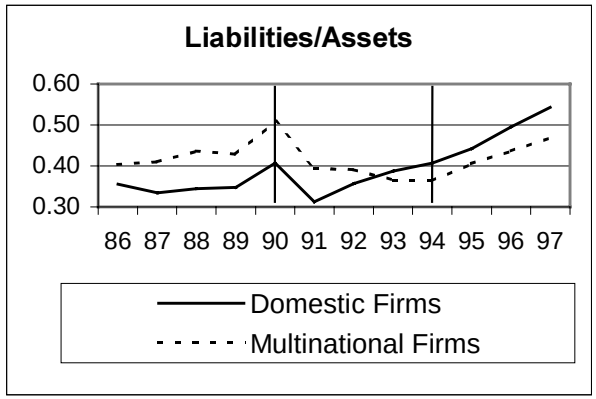
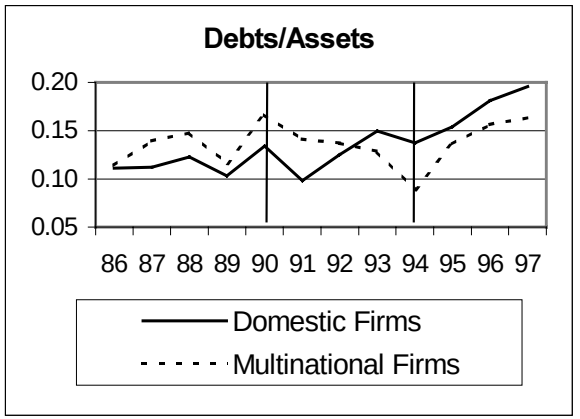


(b)

Figure 7



(a)



(b)

Table 1: Selected Macroeconomic Data

	Inflation (%)	**GDP Growth** (%)	**Current Account** (%GDP)	**Exports** (%GDP)	**Imports** (%GDP)	**Oil** [1/] (% Imports)	**Coffee** (%Exports)	**Terms of trade**	**International Reserves** [2/] (US$ million)	**Real Exchange Rate** [3/]
74-82	63.6	6.6	-4.7	7.3	8.4	33.6	13.0	125.2	7011.9	91.2
83-90	699.0	3.2	-0.7	10.3	5.8	30.9	7.4	103.2	8,756.3	175.4
91-94	1,261.4	-0.2	0.2	8.6	5.7	11.6	3.7	112.5	26,044.3	155.4
95-97	11.9	4.2	-3.3	6.4	7.2	2.9	4.3	115.2	56,521.7	123.7
1990	1,794.8	3.2	-0.8	7.0	4.6	21.1	3.5	114.8	9,973	130.3
1991	478.1	-4.6	-0.4	8.2	5.4	16.0	4.4	117.6	9,406	151.2
1992	1,149.1	0.3	1.6	9.6	5.5	14.9	2.7	109.3	23,754	163.4
1993	2,489.1	-0.8	-0.1	9.0	5.9	8.5	2.8	109.1	32,211	160.2
1994	929.3	4.2	-0.3	7.8	5.9	7.1	5.1	114.0	38,806	146.6
1995	22.0	5.7	-2.5	6.5	6.9	5.2	4.2	115.3	51,840	126.4
1996	9.3	4.2	-3.2	6.4	7.1	0.7	3.6	115.0	60,110	121.4
1997 [4/]	4.3	2.7	-4.0	6.4	7.6		5.2		57,615	123.3

Sources: Boletim do Banco Central do Brasil, FUNCEX, International Financial Statistics (IMF)

1/ Oil and natural gas

2/ International Liquidity

3/ E(WPI*/CPI): Nominal exchange rate, multiplied by US Wholesale Price Index, divided by Brazilian Consumer Price Index.

4/ Current account, export and import data up to July

Table 2: Contribution to Trade Balance
(10-sector aggregation)

	Food Products and Beverages	Textiles, Apparel and Footwear	Transport Equipment	Metal Products	Chemical	Wood, Paper and Products	Construction Material	Machinery	Energy Material	Other Industries
74-82	0.4288	0.0702	0.0229	0.0371	-0.0740	0.0175	-0.0011	-0.1244	-0.3660	-0.0110
83-90	0.2223	0.0601	0.0312	0.1366	-0.0793	0.0266	0.0012	-0.0903	-0.2953	-0.0133
91-94	0.1532	0.0467	0.0158	0.1805	-0.0945	0.0437	0.0019	-0.1337	-0.1918	-0.0217
95-97	0.1980	0.0271	-0.0199	0.1540	-0.0774	0.0478	0.0004	-0.1776	-0.1282	-0.0243
1990	0.1750	0.0515	0.0428	0.1856	-0.0947	0.0320	0.0003	-0.1417	-0.2322	-0.0186
1991	0.1327	0.0537	0.0330	0.2135	-0.0986	0.0326	0.0009	-0.1286	-0.2191	-0.0201
1992	0.1485	0.0562	0.0360	0.1749	-0.0903	0.0406	0.0010	-0.1273	-0.2161	-0.0235
1993	0.1513	0.0429	0.0133	0.1736	-0.0910	0.0481	0.0034	-0.1273	-0.1924	-0.0219
1994	0.1803	0.0340	-0.0191	0.1599	-0.0982	0.0534	0.0021	-0.1515	-0.1395	-0.0214
1995	0.1807	0.0263	-0.0433	0.1640	-0.0773	0.0602	0.0018	-0.1649	-0.1225	-0.0249
1996	0.1940	0.0303	-0.0120	0.1646	-0.0740	0.0428	0.0001	-0.1747	-0.1386	-0.0324
1997	0.2193	0.0248	-0.0045	0.1336	-0.0809	0.0403	-0.0007	-0.1932	-0.1233	-0.0154

Source: IBGE and FUNCEX

Table 3: Revealed Comparative Advantage - Balassa's Index

(10-sector aggregation)

	Food Products and Beverages	Textiles, Apparel and Footwear	Transport Equipment	Metal Products	Chemical Products	Wood, Paper and Products	Construction Material	Machinery	Energy Material	Other Industries
1986	3.1364	1.1520	0.7125	2.4402	0.4022	1.1629	0.6125	0.3245	0.5530	0.2955
1987	3.1567	1.1759	0.9625	2.3162	0.3107	1.0862	0.5708	0.3070	0.6740	0.3179
1988	2.9034	1.0938	0.8728	2.7100	0.2979	1.2804	0.5841	0.2993	0.8320	0.2173
1989	2.7652	1.0613	0.9287	2.8408	0.3457	1.1800	0.6370	0.3268	0.6682	0.2672
1990	2.9444	1.0293	0.8708	3.1946	0.3788	1.3065	0.5866	0.3103	0.5170	0.3176
1991	2.5808	1.0515	0.8072	3.5885	0.3857	1.3874	0.6111	0.3198	0.4882	0.3471
1992	2.6849	1.0564	0.9717	3.4264	0.3357	1.5768	0.6735	0.3314	0.5301	0.3291
1993	2.8163	1.1443	0.9949	3.4320	0.4525	0.8081	0.8957	0.3526	0.6067	0.2902
1994	3.1015	0.9062	0.9535	2.9531	0.3896	1.8603	0.7600	0.3186	0.6384	0.3221
1995	3.1510	0.8935	0.8725	2.8121	0.4389	2.1495	0.7896	0.3123	0.6017	0.3382

Table 4: Grubel & Lloyd Intra-Industry Index

(10-sector aggregation)

	Food Products and Beverages	Textiles, Apparel and Footwear	Transport Equipment	Metal Products	Chemical Products	Wood, Paper and Products	Construction Material	Machinery	Energy Material	Other Industries	Aggregate
74-82	0.3246	0.1861	0.7243	0.7583	0.3304	0.7272	0.7983	0.4835	0.1408	0.7427	0.3979
83-90	0.2802	0.2426	0.5522	0.2889	0.6499	0.3438	0.6177	0.8725	0.5049	0.8904	0.4547
91-94	0.4139	0.4578	0.7170	0.2704	0.5842	0.3265	0.6929	0.7544	0.4381	0.9340	0.5128
95-97	0.5141	0.7746	0.8747	0.4238	0.5318	0.5545	0.9487	0.5149	0.3624	0.7341	0.5657
1990	0.3699	0.3811	0.5646	0.2933	0.5601	0.4016	0.7762	0.7057	0.4298	0.9710	0.4731
1991	0.4593	0.3992	0.6223	0.2639	0.5545	0.4121	0.7380	0.7440	0.3977	0.9581	0.4912
1992	0.3557	0.3206	0.5731	0.2502	0.6464	0.2762	0.6701	0.8176	0.4277	0.9837	0.4791
1993	0.3998	0.5137	0.7352	0.2620	0.6156	0.2975	0.6177	0.7853	0.4375	0.9164	0.5213
1994	0.4410	0.5977	0.9374	0.3054	0.5205	0.3203	0.7458	0.6709	0.4896	0.8776	0.5597
1995	0.5707	0.8184	0.7929	0.4304	0.4931	0.5238	0.9418	0.5122	0.3750	0.6969	0.5640
1996	0.5694	0.8017	0.8884	0.4227	0.5142	0.6204	0.9430	0.4770	0.3118	0.6165	0.5601
1997	0.4021	0.7038	0.9428	0.4183	0.5879	0.5194	0.9612	0.5555	0.4005	0.8888	0.5731

Table 5: Pattern of Finance

	Debts/Assets			Liabilities/Assets		
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation
86 - 89	0.11	0.08	0.12	0.35	0.32	0.17
90 - 93	0.13	0.09	0.13	0.37	0.35	0.18
94 - 97	0.16	0.13	0.18	0.47	0.41	0.41
86 - 97	**0.14**	**0.11**	**0.12**	**0.40**	**0.36**	**0.21**

Table 6 : Regression Results

Dependent Variable : Investment

Independent variable and summary statistics	*Whole Sample*			*Large Firms*		*Small Firms*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$(CF/K)_{it}$		1.339	0.882	1.985	1.860	1.313	0.852
		(10.111)	(3.708)	(4.793)	(7.220)	(8.405)	(3.662)
CF/K slope dummy 1994-1997			0.553		0.138		0.604
			(1.933)		(0.407)		(2.005)
$(S/K)_{it}$	-0.284	-0.127	-0.118	0.233	0.239	-0.137	-0.134
	(-3.975)	(-5.462)	(-5.115)	(1.299)	(1.267)	(-6.695)	(-6.764)
$(S/K)_{i,t-1}$	0.284	0.101	0.084	-0.319	-0.328	0.112	0.100
	(3.467)	(3.397)	(3.106)	(-1.632)	(-1.553)	(3.926)	(3.755)
$(S/K)_{i,t-2}$	-0.034	-0.001	0.004	0.034	0.038	-0.004	-0.001
	(-0.034)	(-0.069)	(0.341)	(0.882)	(0.902)	(-0.309)	(-0.121)
R^2	0.515	0.807	0.816	0.863	0.863	0.792	0.805
Number of firms	468	468	468	75	75	393	393
Number of observations	4680	4680	4680	750	750	3930	3930

Notes : The dependent variable is investment-capital ratio. The CF/K slope dummy is a variable that has value equal to CF/K for the years 1994 to 1997, and zero in all other years. All regressions have been estimated using firms' fixed effects and dummies for the years 1990 and 1994, but the coefficients are not reported. The t-statistics in parentheses are based on White heteroskedasticity-consistent standard errors.

Table 7: Regression Results
Dependent Variable : Investment

Independent variable and summary statistics	*Multinational Firms*		*Domestic Firms*		*More Dependent*		*Less Dependent*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$(CF/K)_{it}$	1.098	1.367	1.437	0.878	1.022	0.644	1.573	1.304
	(5.939)	(6.738)	(8.036)	(3.737)	(6.040)	(2.883)	(9.014)	(7.613)
CF/K slope dummy 1994-1997		-0.284		0.737		0.520		0.302
		(-1.238)		(2.278)		(1.669)		(1.175)
$(S/K)_{it}$	-0.152	-0.158	-0.141	-0.136	-0.128	-0.121	-0.091	-0.086
	(-1.762)	(-1.794)	(-6.346)	(-6.413)	(-5.466)	(-5.516)	(-1.904)	(-1.811)
$(S/K)_{i,t-1}$	0.040	0.052	0.115	0.098	0.128	0.108	0.037	0.033
	(0.591)	(0.714)	(3.752)	(3.516)	(2.879)	(2.644)	(1.087)	(0.993)
$(S/K)_{i,t-2}$	0.040	0.037	-0.006	-0.002	-0.016	-0.011	0.031	0.031
	(1.130)	(1.040)	(-0.469)	(-0.193)	(-1.139)	(-0.796)	(2.001)	(2.155)
R^2	0.918	0.918	0.785	0.802	0.765	0.780	0.844	0.846
Number of firms	46	46	413	413	179	179	289	289
Number of observations	460	460	4130	4130	1790	1790	2890	2890

Notes : The dependent variable is investment-capital ratio. The CF/K slope dummy is a variable that has value equal to CF/K for the years 1994 to 1997, and zero in all other years. All regressions have been estimated using firms' fixed effects and dummies for the years 1990 and 1994, but the coefficients are not reported. The t-statistics in parentheses are based on White heteroskedasticity-consistent standard errors.

Table 8: Credit to Private Sector

(%GDP)

	Argentina	Brazil	Philippines	France	Germany	India	Mexico	South Africa	Tunisia	Uruguay	United States
1991	12.5	33.1	17.8	96.6	89.7	25.6	20.2		53.8	28.5	66.7
1992	15.2	54.3	20.6	96.7	90.7	26.6	27.2	62.7	54.0	27.5	63.3
1993	16.5	82.2	26.4	92.0	96.5	25.7	30.4	62.4	53.9	27.0	62.5
1994	18.2	45.5	29.1	86.1	98.8	25.2	36.6	65.5	53.8	25.6	62.7
1995	18.1	30.8	37.5	84.9	99.8	24.3	26.7	67.5	54.5	28.3	65.0
1996	18.1	26.3	49.0	81.8	104.9	25.6	16.4	70.5	49.1	28.8	65.6
1997	19.3	26.0	56.5	80.7	108.2		12.7	73.5	50.2	31.1	67.1

Source: International Financial Statistics, IMF.

Table 9: Regression Results
Dependent Variable : Investment

Independent variable and summary statistics	*Whole sample*	*Winners*	*Losers*
	(1)	(2)	(3)
Interaction (external dependence X firm size)	308.985	206.645	959.942
	(2.601)	(2.276)	(3.508)
$(S/K)_{it}$	-0.284	-0.325	-0.272
	(-3.996)	(-4.831)	(-3.092)
$(S/K)_{i,t-1}$	0.283	0.277	0.286
	(3.482)	(4.375)	2.608
$(S/K)_{i,t-2}$	-0.035	-0.032	-0.036
	(-1.235)	(-1.515)	(-0.793)
R^2	0.516	0.502	0.533
Number of firms	468	235	233
Number of observations	4680	2350	2330

Notes : All regressions were estimated using firms' fixed effects, but the coefficients are not reported. The t-statistics in parentheses are based on White heteroskedasticity-consistent standard erros.

Table 10: Contribuition to Trade Balance across periods

	82-90 over 74-82	90-94 over 82-90	94-97 over 90-94
Metal Products	↑	↑	↓
Rubber Products	↑	↑	↓
Paper and Products	↑	↑	=
Apparel and Footwear	↑	=	↓
Non-Metal Products	↑	=	=
Machinery	↑	↓	=
Tobacco	=	↑	↑
Beverages	=	=	=
Transport Equipment	=	=	↓
Perfumery and Soap	=	=	↓
Chemical Products	=	↓	=
Other Industries	=	↓	=
Drugs	=	↓	↓
Electric Equipment	=	↓	↓
Plastic Products	=	↓	↓
Furniture	↓	↑	↑
Wood Products	↓	↑	↑
Leather	↓	↑	↑
Printing and Publishing	↓	=	↓
Food Products	↓	↓	↑
Textiles	↓	↓	↓

Notes:

↑ winners

↓ losers

= stagnant

Table 11: Correlation Coefficient between external dependence and CTB

1974	-0.14
1975	-0.18
1976	-0.20
1977	-0.18
1978	-0.22
1979	-0.24
1980	-0.18
1981	-0.19
1982	-0.22
1983	-0.23
1984	-0.22
1985	-0.25
1986	-0.28
1987	-0.27
1988	-0.27
1989	-0.29
1990	-0.32
1991	-0.29
1992	-0.31
1993	-0.30
1994	-0.35
1995	-0.35
1996	-0.39
1997	-0.39

Averages	
74-82	-0.20
82-86	-0.25
86-90	-0.29
90-94	-0.32
94-97	-0.37