

**THE PROFILE
OF BRAZIL'S
MANUFACTURING
EXPORTERS IN
THE NINETIES:
WHAT ARE THE MAIN
POLICY ISSUES**

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Abstract

This paper offers a contribution to the understanding of the micro-determinants of the export activity in Brazil during the 1990s, analyzing the main attributes of firms that engage in exporting manufactured goods in general, and participate in different regional markets in particular. It draws four main policy implications that go in the direction of allowing markets to optimize export composition, expanding the export volume of existing exporters, promoting entry of new exporters and diversifying markets.

1. Introduction

In the nineties, Brazil underwent a dramatic process of trade liberalization, with a remarkable reduction in tariff and non-tariff barriers and the establishment of Mercosur. As a consequence, imports soared from 14.6 to 49.2 billion dollars from 1988 to 1999. Measured in constant prices, Brazilian imports increased on average 11.7% p.a. in this period – 15.1% p.a. in 1993-97. As Moreira (1999) shows, in manufacturing the participation of imports in domestic demand rose from 4.5% in 1989 to 14.7% in 1999. This process was fundamental to support price stability, increase competition, attract foreign direct investment and encourage productivity growth. A frustrating outcome, however, was the failure of exports not only to keep up with the import surge, but also to sustain the remarkable performance of the 1970s and 1980s. In 1988-99, exports grew on average 5.7% p.a., well below the 11.9% mark of 1973-87. More to the point, this mediocre performance was achieved against a backdrop of rising export prices, a trend reversed in 1998-99.

This gap between import and export growth turned the sizable trade surpluses of the 1980s into the deficits of the 1990s, fueling the country's current account deficit and becoming a source of economic instability. On at least three occasions, since 1995, economic growth had to be substantially curtailed to keep the external accounts under control. It is not surprising, therefore, that all scenarios built for the Brazilian economy in recent years have stressed the need to achieve very high rates of export growth.¹ This explains why the government has set a target, rather challenging from today's perspective, to export US\$ 100 billion in 2002, up from US\$ 48 billion in 1999.

In a frictionless neoclassical world, this export challenge could be "easily" overcome by getting prices right – and there is, in fact, much to be said in favor of such an approach in Brazil, even after the devaluation of the real in 1999. One could argue, therefore, that with a floating exchange rate, markets, if let alone, would produce the necessary adjustment. In the real world, however, sunk investments, limits to the pace of productivity growth, labor market rigidities, failures in capital and other markets, and the need to reconcile export promotion with other policy objectives, such as inflation control and fiscal adjustment, limit the benefits, and increase the costs of relying exclusively on a hands-off, market approach.

Therefore, there is room for a complementary policy that seeks to operate at the sector/firm level, trying to overcome the micro-barriers that impede the expansion of exports, reducing

1 See, for instance, Pinheiro, Giambiagi and Najberg, 1997, McKinsey 1998, and Giambiagi 1999.

rigidities, overcoming information failures, solving collective action problems, encouraging firms to make sunk investments in export activities, and so forth. This is in part the objective of different government agencies such as the Foreign Trade Chamber (Câmara de Comércio Exterior) and the Export Promotion Agency (Agência de Promoção das Exportações). To succeed, such initiatives require a large volume of micro information, which is barely organized, let alone properly analyzed.

This paper offers a contribution to the understanding of the micro-determinants of the export activity, analyzing the main attributes of firms that engage in exporting manufactured goods in general, and participate in different regional markets in particular. The paper is organized in four sections in addition to this introduction. Section 2 presents a review of recent issues, export trends and basic descriptive statistics on Brazilian manufactured exports and exporters. Section 3 analyzes a model that helps to identify the key determinants of a firm's decision to export manufactured goods and, once an exporter, how much to export. Section 4 repeats this exercise for different regional markets. A final section draws the relevant conclusions.

2. Manufactured Exports and Exporters Pre- and Post-liberalization

A remarkable feature of the Brazilian economy in the seventies was the concern to foster exports at a time when import substitution (IS) dominated the country's development strategy. Support was particularly strong for manufactured exports, which benefited from a system of incentives and subsidies and a crawling peg regime that protected the real exchange rate from inflation. The external shocks of the early eighties encouraged the government to increase export incentives and to sharply devalue the exchange rate, further boosting manufactured exports. From 1974 to 1987, they experienced a seven-fold increase, expanding their share in total exports from 24.1 to 49.6%, and doubling Brazil's share of world manufactured exports to 0.8%. Exports also became more diversified, with an increased participation of capital-intensive goods (Table 1), reflecting not only changes in Brazil's factor endowment, but also the heavy bias of export and investment incentives.

Despite their success in fostering manufactured exports, these policies were rather costly and in many cases failed to turn exports into more than just a poor alternative to domestic sales. Export subsidies during the 1970s and 1980s averaged more than 50% of the value of manufactured exports, well above the figures for South Korea (20%, on average, during the same period;

Table 1
Brazil's Composition of Manufactured Exports, 1974-99

<i>Sectors*</i>	<i>1974-79</i>	<i>1980-89</i>	<i>1990-99</i>
Capital intensive	30,1	47,2	51,2
Steel	3,8	9,3	10,4
Vehicle parts & Other vehicles	5,3	6,4	9,3
Machinery	3,3	4,3	5,5
Non-ferrous Metals	0,6	3,1	5,2
Oil Refining	1,8	8,4	4,7
Automobiles, Trucks and Buses	3,4	5,0	4,6
Electrical Machinery & Appliances	1,8	2,0	3,3
Textile	5,7	4,1	3,0
Electronic and Communications Equip.	2,5	2,8	2,3
Miscellaneous Chemical Products	1,3	1,0	1,7
Rubber	0,4	0,9	1,4
Labor intensive	10,0	13,7	18,0
Wood Pulp, Paper	1,6	3,5	5,0
Wood Products	2,3	1,8	3,2
Footwear	3,9	5,1	5,6
Miscellaneous Metal Products	1,0	1,5	1,9
Miscellaneous	1,3	1,7	2,2
Natural resources	59,9	39,1	30,9
Chemicals	0,7	1,6	2,3
Refined Sugar	8,3	2,9	3,4
Meat Products	2,9	3,7	3,8
Coffee	23,8	11,5	5,9
Vegetable Oil	14,9	10,8	7,2
Processed Vegetable Goods	7,1	7,0	6,7
Other Food Products	2,3	1,6	1,5
Total Manufactured Exports	100,0	100,0	100,0

**Based on total factor requirements according to the 1996 input-output matrix (Moreira and Najberg 2000).
Source: Funcex.*

Moreira 1995:110), a country widely held as an “aggressive” exporter. Yet, by the end of the 1980s, manufactured exports still accounted for less than 10% of manufacturing output. Manufactured exports also remained highly concentrated on a few firms. In 1990, 53 companies answered for approximately 44% of all manufactured exports (Table 2).

The reasons for this limited export orientation seem to go beyond the “continental economy” argument. The high, widespread and unconditional protection associated with the IS regime also played a key role in restraining Brazil’s export drive. It dampened local firms’ incentives to cut costs and increase productivity; distorted relative prices moving resources away from industries with comparative advantage; and curtailed the relative

Table 2
Distribution on Firms by Value of Manufactured Exports*

<i>Class (exports, US\$ Million)</i>	<i>Frequency</i>	<i>Accumulated freq.</i>	<i>Accumulated % of exports</i>
1990			
0- - - - 1	5294	79,18%	4,22%
1- - - - 10	1087	95,44%	24,50%
10- - - - 50	252	99,21%	55,58%
50- - - - 100	31	99,67%	67,80%
100- - - - 250	13	99,87%	79,11%
250- - - - 500	7	99,97%	92,95%
500- - - - 1000	2	100,00%	100,00%
1000- - - -	0	0%	0%
	6,686	100,00%	100,00%
1995			
0- - - - 1	9213	82,69%	4,84%
1- - - - 10	1503	96,18%	23,65%
10- - - - 50	324	99,08%	50,12%
50- - - - 100	64	99,66%	67,54%
100- - - - 250	26	99,89%	81,85%
250- - - - 500	11	99,99%	97,25%
500- - - - 1000	1	100,00%	100,00%
1000- - - -	0	0%	0%
	11,142	100,00%	100,00%
1999			
0- - - - 1	11829	84,29%	5,6%
1- - - - 10	1755	96,79%	26,6%
10- - - - 50	357	99,34%	54,4%
50- - - - 100	56	99,74%	68,4%
100- - - - 250	28	99,94%	83,0%
250- - - - 500	7	99,99%	91,0%
500- - - - 1000	1	99,99%	93,7%
1000- - - -	1	100,00%	100,00%
	14,034	100,00%	100,00%

*Secex classification.
Source: Secex.

profitability of exports, with value-added for domestic sales standing well above that of exports. This last effect was particularly important, given that limitations of the “drawback” scheme forced exporters to shoulder the burden of an excessively backward-integrated industrial structure.

Brazil’s heavy reliance on foreign firms (FFs), particularly in capital-intensive sectors, is also mentioned as a factor that restricted access to the developed countries’ markets mainly to intrafirm trade, in view of parent-affiliate arrangements. Both Fajnzylber (1971) and Newfarmer (1983) find evidence that during

the 1960s and 1970s FFs in Brazil sold most of their exports to regional markets in the South. Yet, the net effect of foreign ownership on export performance is not clear, since FFs helped to achieve export diversification, through their privileged access to capital, technology and distribution channels. In fact, since the 1960s these firms have answered for a large and increasing share of manufactured exports. Estimates for the 1970s and 1980s (BNDES 1988 and Baumann 1985) put this share between 30 to 35%. Data at the firm level also points to a positive impact of foreign ownership on export performance during the IS period. Willmore (1986, 1992), for instance, using data for 1978 and 1980, found a very strong positive effect of foreign ownership on manufactured exports.

This strong bias against exports began to decline in the early nineties, when the economy was opened up. Trade reform was marked, on the import side, by the immediate removal, in 1990, of most non-tariff barriers and by the announcement of a multi-year tariff reduction program, which brought the average nominal tariff down from 32.2% in 1990 to 14.2% in the second semester of 1993. On the export side, subsidies were eliminated and incentives reduced to a minimum. Trade reform also involved the establishment, in March 1991, of Mercosul: a common market with Argentina, Uruguay and Paraguay. A common external tariff with seven bands, ranging from zero to 20%, was put into effect in January 1995, comprising all items except capital goods, computer equipment and cars.²

Trade reform provided exporters with access to modern capital goods and inputs at international prices, which, combined with higher productivity growth and a process of specialization triggered by greater competition, gave Brazilian firms stronger incentives and better conditions to penetrate international markets.³ Moreover, in the second half of the decade, the export financing system began to be rebuilt on a market-friendly basis.⁴ Yet, exports were slow to respond. As seen in Table 3, after signs of a strong recovery in 1992-94, export growth moved into a downward trend, reversed for only a brief period in 1997. More to the point, Chart 1 suggests that despite the reduction in trade bias a substantial trade-off between internal and external markets prevailed until the devaluation in 1999, with firms switching to domestic sales whenever local demand picked up.⁵

This relatively slow response of exports to trade liberalization is not completely unexpected. Earlier experiences showed

2 For details see Moreira and Correa (1998), and Averbug (1999).

3 According to Bonelli and Fonseca (1998), in 1990-97, total factor productivity in manufacturing grew by 2.2 % p.a. The same figure for the 1980s was -0.2%.

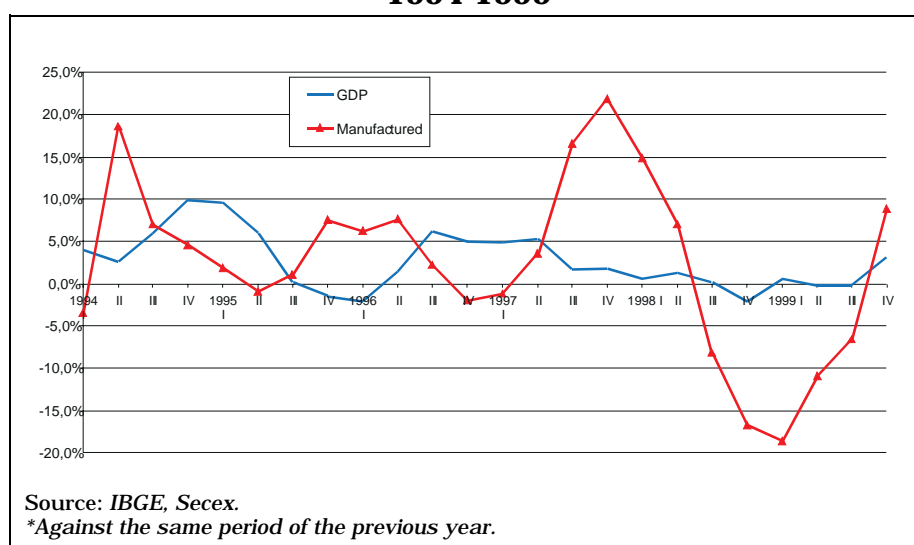
4 For details see Sucupira and Moreira (2000).

5 The exception to this rule was the third quarter of 1998, when lower GDP growth was followed by a drop in manufactured exports. Behind these events, though, is the Russian default, which not only had a negative impact on Brazil's main export markets, but also led to a shortage of export financing.

Table 3
Growth of Brazilian Exports by Main Categories (1990-99)

Years	Total		Primary		Semi-manufactured		Manufactured	
	US\$	Quantum	US\$	Quantum	US\$	Quantum	US\$	Quantum
1990	-9,0	-7,0	-8,3	1,0	-12,0	0,0	-8,0	-13,0
1991	0,7	2,6	-0,1	-1,7	-8,2	0,6	4,4	6,3
1992	13,2	17,0	1,1	6,4	22,6	27,3	16,9	19,5
1993	7,7	16,5	6,1	8,9	-5,3	-0,1	12,9	25,2
1994	12,9	2,1	18,1	2,7	26,6	10,4	6,5	-1,0
1995	6,8	-6,1	-0,8	-5,1	32,7	7,2	2,4	-11,1
1996	2,7	2,7	8,5	2,5	-5,8	4,9	3,3	2,7
1997	11,0	10,2	21,6	12,6	-1,6	-0,1	10,5	12,6
1998	-3,5	3,4	-10,4	6,7	-4,1	3,6	0,6	2,1
1999	-6,1	6,4	-8,8	8,4	-1,8	15,9	-6,9	2,0
1990-1999	3,6	4,8	3,9	4,2	4,3	7,0	4,3	4,5

Chart 1
Quarterly Growth* of GDP and Manufactured Exports:
1994-1999



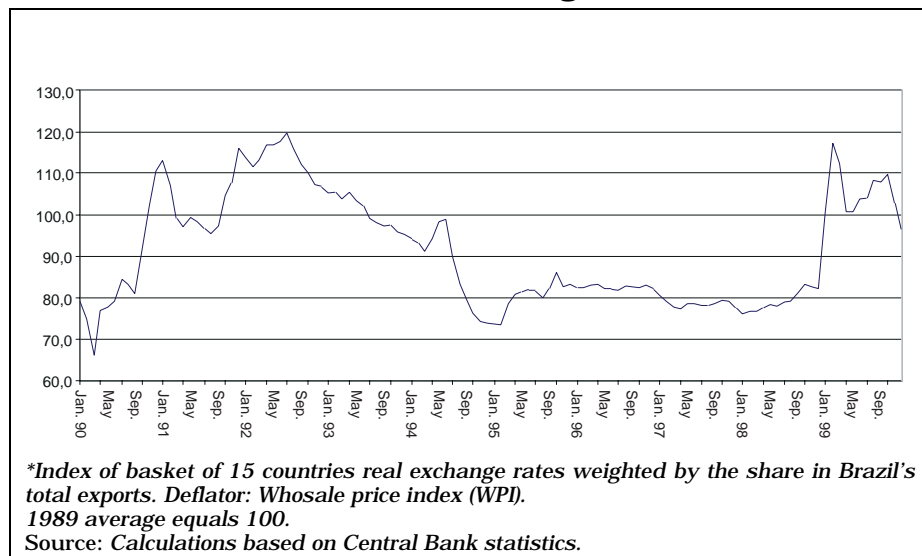
that in the aftermath of trade liberalization importers respond much faster than exporters (Papageorgiu et al., 1991), because the latter face higher information and distribution costs than do importers, who can count on well-established international distribution and information networks. In the medium term, however, exports tend to catch up, given the incentives accruing from: a) lower protection; b) higher productivity; c) wider access to inputs and vintage capital goods at international prices; and d) the real exchange rate devaluation produced by a higher demand for foreign currency.

In Brazil's case, though, unlike most successful experiences in developing countries, trade liberalization was not fol-

lowed, in its first years, by real exchange rate devaluation. Quite the contrary. As shown in Chart 2, after a clear devaluation over the 1990-92 period, the real exchange rate shifted to an upward trend, which more than offset the previous devaluation.⁶ As of December 1998, it was 18% above the 1989 average. This upward trend was only broken in January 1999, when the deterioration of the international markets, disrupted by the Russian default, forced the government to float the exchange rate, a decision which produced a major devaluation. As far as the nineties are concerned, though, the die was already cast. This peculiarity of Brazil's experience is certainly one of the main factors behind the slow response of exports in the first decade of the new regime.

Low growth was accompanied by little change in the export composition. Table 1 shows that the move towards a more capital-intensive export bill proceeded after 1990, even if at a slower pace. The lack of a substantial shift towards more labor and resource-intensive goods might reflect the changes in Brazil's factor endowment after so many years of relatively high growth under IS. Yet, one also has to take into account that even though incentives in the new regime are more sector neutral, they are still biased towards capital-intensive sectors. Industries such as consumer electronics, computers, capital goods and cars all benefit from higher-than-average tariffs, even within Mercosur.⁷

Chart 2
Brazil's Real Effective Exchange Rate:* 1990-99



- 6 Until July 1994, Brazil had a backward-looking, crawling-peg exchange rate system. In July 1994, after the Real Stabilization Program was implemented, the government dropped the crawling-peg policy and allowed the nominal exchange rate to appreciate. In March 1995, however, pressured by the Mexican Crisis and by the deterioration of the trade balance, the government intervened in the exchange market, devaluing the currency by 5.2%. After the devaluation, a new exchange band regime was implemented, with frequent government interventions aiming at a gradual devaluation of the real against the dollar.
- 7 As of December 1999, the tariff rates for cars, consumer durables and capital goods were respectively 35%, 16,1% (average) and 12,7% (average), well above the 9,7% average tariff (Receita Federal, *Relatório de Importações*, Dec. 1999).

This structure of protection gives room for a growing intra-regional trade of capital intensive goods. The car industry was particularly favored by the so-called “automobile regime”, a full-scale export-import incentive scheme whereby local car firms that export were entitled to tax incentives and generous tariff discounts when importing cars, equipment and parts. The value of those imports was limited to the value of company exports.⁸

Looking from a different perspective, and overlooking the constraints imposed by Brazil’s factor endowment, some analysts (see, e.g., Ricupero 2000) put the blame of Brazil’s lackluster export performance in the 1990s on its export composition. According to this argument, the lack of export dynamism would be related to the fact that Brazil does not export the most dynamic products in the international market. These products would be the ones produced by high-tech or technology-intensive industries. Yet, Crocco and Moreira (1998), using a constant market share model, showed that export composition, at least in the first half of the decade, did not explain Brazil’s decreasing market share in the international markets. Quite the contrary. The “competitiveness effect”, i.e. issues related to the price and quality of the products, was the main factor behind it.⁹

Turning to concentration, Table 2 reveals that trade liberalization did not make much of a dent on the high concentration of manufactured exports across firms, which remained largely concentrated in the hands of few companies. To be more precise, concentration, measured by the Herfindahl-Hirshman index, fell by 4% in 1990-99. But a careful reading of Table 2 also shows that the relatively stable levels of concentration co-existed with a substantial increase (109.9%) in the number of manufacturing export firms, particularly among the small exporters (123%, under US\$ 1 million class), and concentrated in the first half of the decade (67% in 1990-95 and 26% in 1995-99). Taken as a whole, the new exporters accounted for 78.4% of the total growth in manufactured export in this period. These results are consistent with those of Motta Veiga and Markwald (1998), who also found a fairly stable concentration in 1990-96. Large firms (over 500 employees) raised their share of total exports from 47% to 50%, even though as a share of the number of export firms they shrunk from 10.7% to 7.7%. They also found that the number of export firms rose 59% in 1990-96, with most of this increase concentrated in the 1990-93 period.

As pointed out by Motta Veiga and Markwald (op. cit.), these findings qualify the argument of Roberts, Sullivan and

8 The “automobile regime” was established in December 1995 (Decree 1761, 13/06/95). Incentives were valid for 4 years, ending in December 1999. For details see De Negri (1998) and Araujo Jr. (1998).

9 Due to data limitations, the model was applied to Brazil’s exports to OECD (75% of total exports) in 1990-95. Fonseca and Velloso (1998), using the same database but a different methodology reached similar conclusions.

Tybout (1995:56), according to which “rapid export expansion is generally accomplished by inducing large numbers of non-exporters to start selling abroad”. Brazil met this condition in the 1990s and still was not able to manage a rapid and sustained growth of exports.

The data also shows that in the 1990s the participation of foreign firms in manufactured exports continued to grow (Table 4). In fact, the signs are that it has been accelerated by the new regime. One possible reason for this tendency was the foreign direct investment (FDI) boom, which has followed the successful stabilization of the economy in 1994. Net FDI jumped from US\$ 2,1 billion in 1994 to US\$ 30 billion in 1999. The figures for manufacturing industry, though, are more modest, with FDI reaching US\$ 2.0 billion in 1999, after several years of negative investment. The FDI boom alone, however, does not tell the whole story. One can also argue that the new regime is allowing FFs to make a better use of their advantages in terms of access to capital, technology and distribution channels. Moreover, it is giving them more incentive to export. Unlike the IS period, these incentives, except for the car industry, are now mainly market driven, suggesting a better balance between FDI costs and benefits for the country.

Table 5 reveals that, unlike most other aspects discussed so far, the destination of manufactured exports has changed quite dramatically since the economy was opened up. There has been a major shift towards the South, led by exports to Latin America. Behind this movement is the so-called Mercosur effect. From the establishment of the common market, in 1991, to 1999, Brazilian manufactured exports to the member countries grew on average 24% p.a. Both foreign and local companies followed this trend, but the former did so to greater lengths. Whereas in 1990, 69.4% of foreign firms manufactured exports were sold in industrialized economies, in 1999 the developing countries emerged as their main market.

This suggests that Fajnzylber (op. cit.) and Newfarmers (op. cit.) concerns about a possible destination bias in foreign firms exports became much more relevant after trade liberalization

Table 4
Brazilian Manufactured* Exports by Ownership –
1990-1999 (%)

<i>Firms</i>	<i>90</i>	<i>95</i>	<i>99</i>
Foreign Companies**	30,81	38,10	38,28
Local Companies	69,19	61,90	61,72
Total	100,00	100,00	100,00

*Secex classification.

**Firms controlled by non-residents.

Source: Own calculations using Secex data.

Table 5
Brazilian Manufactured Exports by Ownership and Destiny - 1990-1999 (%)

Destination	90			95			99		
	FF**	LC***	Total	FF	LC	Total	FF	LC	Total
US/Canada	33,3	35,7	35,0	22,7	24,3	23,7	21,7	32,5	28,4
Other Developed Countries	36,1	27,7	30,3	21,6	27,9	25,5	23,8	24,5	24,2
Total Developed Countries	69,4	63,5	65,3	44,3	52,2	49,2	45,5	57,0	52,6
Latin America	22,9	16,5	18,5	46,1	31,6	37,2	47,2	30,7	37,0
Other Developing Countries	7,6	19,4	15,8	9,6	16,2	13,7	7,3	12,3	10,4
Total Developing Countries	30,5	35,9	34,3	55,7	47,8	50,8	54,5	43,0	47,4
Other n.e.s. Countries	0,2	0,6	0,5	0,0	0,0	0,0	0,0	0,0	0,0
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

**Foreign Firms. Firms controlled by non-residents.

***Local companies.

Source: Secex.

than during the IS period. In fact, data for 1990 give no support to this argument, at least as far as manufactured exports are concerned. Not only were foreign firms selling most of their manufactured exports to the North, but there was also a very small difference with regard to the local firms' pattern of export destination. This issue comes up in 1999, when there are signs of a foreign firm bias towards developing countries (Table 5). We will return to this point later on.

3. Who Exports in Brazil and How Much?

This section presents a model that helps to identify the key determinants of a firm's decision to export manufactured goods in the post-liberalization period and, once an exporter, how much to export. This exercise was based on firm-level data pooled for the 1995-1997 period, drawn mainly from a corporate income tax database.¹⁰ The number of firms in the sample ranges from 18.4 thousand in 1997 to 22.8 thousand in 1995. In 1995 and 1996, 22% of all firms in the sample were exporters; in 1997, 26%.¹¹ In 1995-96, average exports per exporting firm amounted to about US\$ 6.8 million; in 1997, this average rose to 7.5 million dollars. In the three years, exports represented a stable 18.7% of those exporters' total revenues. Together, these industrial firms ex-

10 SEF/MF. There are 200 thousand firms in this data base. They match at least one of the following criteria: a) sales over 12 thousand UFIRs (approximately R\$ 12 million); b) public companies e c) foreign participation in the capital.

11 Notice that the sample used in this section and the next includes only part of the universe of exporters in 1995-97. Essentially we let out of our sample small firms, for which we did not have information on revenues, and small exporters, that is, those that sold abroad less than US\$ 10,000 or had an export/revenue ratio of less than 0.1%. The same criteria were used to select exporters to the various destinations. Additionally, the sample includes only firms with nonnegative revenues.

ported 28.4, 33.4 and 35.4 billion dollars in 1995, 1996 and 1997, respectively.¹²

3.1. Univariate Analysis and Descriptive Statistics

Table 6 presents basic descriptive statistics for exporting and non-exporting firms in 1995-97. It is divided in three blocks. In the first block we break the data according to the destination of exports, an issue to be further explored in Section 4. The second block looks at differences according to a set of characteristics of the firms and of the sectors to which they belong: nature of ownership (whether foreign or national), wage level, proportion of skilled workers, share of four largest firms in sector revenues and size (value of annual revenues). The last block examines how results differ across sectors.

Latin America is the most common destination of Brazilian exports: approximately four out of five Brazilian manufacturing exporters sold to that market every year in 1995-97. In a distant second place come the industrialized countries other than the USA and Canada, followed by these two countries and in fourth and last the developing countries outside Latin America. These figures show that manufacturing exporters are not very diversified with respect to destination markets: the average number of destinations per exporter is just 1.85.

If, on the one hand, more firms export to Latin America than to any other of the four regions considered here, on the other hand the average dollar value of exports per firm to that region is only half of that observed for firms that sell to other regions. The figures also show that exports answer for a much larger share of revenues in the case of firms that sell to industrialized countries than in the case of companies that export to developing countries in general, and to those in Latin America in particular. To some extent, this is due to the fact that these exporters are much larger (higher revenues) than those that sell in the developed countries. That is, Brazilian manufacturing firms that export to developing countries on average are substantially larger than those that export to the industrialized countries.

Foreign manufacturing firms are more likely to export than those national-owned.¹³ Considering only the firms that export, we see that the average value of exports per firm is also much larger for foreign firms than for the entire sample. Moreover, even though the average ratio of exports/revenues for foreign firms is

12 These amounts to over 100% of Brazil's total exports of manufactured goods in those years. This can be explained by the fact that some of the manufacturing firms in the sample export goods other than manufactured goods.

13 Firms were considered to be foreign if controlled by foreigners, that is, if at least 50% plus one share were in the hands of non-nationals.

lower than for the complete set of manufacturing firms, it seems to be approaching the industry average.

Considering employment characteristics (earnings and skills), we see that most manufacturing exporters are in sectors with relatively high wages (above five minimum wages) and comparatively skilled labor forces (20% of the workers have more than complete primary education). This contrasts with the complete sample, for which only about half the firms falls in those categories. This suggests that exporting firms are concentrated in sectors in which workers earn more and are better skilled than in industry as a whole. The results also show that firms in high wage and high skill sectors export more on average than in low-wage and low-skill sectors, respectively. But, because the formers are much larger than the firms in low-wage/low-skill sectors, exports answer for a substantially lower share of their revenues. That is to say, firms in low-wage/low-skill sectors are more export-oriented than those in the sectors with opposite characteristics.

Similar but much less pronounced contrasts arise when we compare firms with regards to size and industry concentration. In this case, we obtain that a minority of manufacturing exporters are in sectors with CC4s (share of four largest firms in total sector revenues) above 0.5 and have revenues above 10 million reais. But these firms export much more individually and as a group than those with opposite characteristics. They, too, have a below average propensity to export (exports to revenue ratio), but the contrast with small firms and with those in low-concentration sectors is relatively weak, and has declined from 1995 to 1997.

The third block in Table 6 distributes the data by sector. It shows that there is great cross-sector diversity in the proportion of firms that export, the volume of their exports and their propensity to export. Considering these indicators, it is worth calling attention to four groups of sectors:

1. Three sectors show a very high propensity to export: tobacco, leather, and footwear and wood. They are also similar in that a significant proportion of the firms in each sector engage in exporting, but differ in that while tobacco exporters have large export revenues, exporters in the other two sectors sell abroad less than the average manufacturing exporter. Note, in particular, the relatively small size of firms exporting leather/footwear and wood, in sharp contrast with the very large firms that export tobacco.

2. A second group of sectors show a relatively lower but still above average propensity to export: Furniture and Other Miscellaneous Products, Foodstuffs and Beverages, Basic Metallurgy, and Non-metallic Mineral Products. These sectors also have a lower proportion of firms engaged in exporting than those in the

first group. Exporters in two of these sectors – Basic Metallurgy and Foodstuffs and Beverages – are large firms with high average export values, while in the other two (Furniture and Other Miscellaneous Products and Non-metallic Mineral Products) exporters are relatively small firms with low average export revenues.

3. A third group is formed by sectors with a relatively high average propensity to export in 1995-97, but one that still falls below the average observed for the industry as a whole. This group includes Textiles; Apparel; Oil Derivatives, Alcohol and Nuclear Fuels; Chemicals and Pharmaceuticals; and Other Transport Equipment and Materials. The more interesting contrast here arises between Textiles and Chemicals/Pharmaceuticals on the one hand, with a relatively stable propensity to export, and the other five, which are characterized by a more erratic behavior.

4. Three other sectors that deserve calling attention to are pulp and paper, machinery and equipment, and cars, buses, trucks and parts. Their propensity to export is relatively low, but increasing in 1995-97. In this sense, they differ somewhat from the remaining sectors in Table 6, which presented consistently low propensities to export (below 10%).

3.2. Multivariate analysis

The results in Table 6 show that on average both foreign and large firms export more in absolute terms and less as a share of total revenues than national and small companies, respectively. But because foreign firms are on average larger than national ones, it is unclear whether they export more just because they are larger or whether there is a separate effect of ownership on export behavior. To some extent, the same uncertainty applies to other variables examined above. Therefore, to assess the separate effects of those variables on export behavior we estimated a set of regressions in which firms' exports are "explained" by their individual characteristics and those of the sectors to which they belong.

We studied the export behavior of firms by looking separately at (1) the probability of a firm being an exporter and (2) how many firms that export sell abroad. Both regressions used data pooled from cross-sections of firms for 1995, 1996 and 1997. The probability of a firm being an exporter was modeled using a probit. As noted before, firms were considered to be exporters ($Y=1$) if they sold abroad at least US\$ 10,000 and had an export/revenue ratio of at least 0.1%.¹⁴ Information on exports was obtained from Secex/MICT. The model for the value of exports for firms that classified as exporters ($X|Y=1$) was estimated by OLS. A common

14 A few firms with export to revenue ratios higher than 1.5 were also eliminated from the analysis.

Table 6
Basic Descriptive Statistics for Manufacturing Exporting Firms

	1995				1996				1997			
	Number of Firms		Average Exports ⁽¹⁾		Number of Firms		Average Exports ⁽¹⁾		Number of Firms		Average Exports ⁽¹⁾	
	Total	Exporters	Value (US\$ 1000)	% of Revenues	Total	Exporters	Value (US\$ 1000)	% of Revenues	Total	Exporters	Value (US\$ 1000)	% of Revenues
All	22823	5027	6721.1	0.187	22146	4880	6836.2	0.187	18392	4745	7458.3	0.186
To the USA and Canada	22823	1768	4127.3	0.152	22146	1644	4479.1	0.153	18392	1549	4783.6	0.155
To other industrialized countries	22823	2289	4977.9	0.159	22146	2099	5310.7	0.165	18392	1894	5716.7	0.158
To Latin America	22823	3902	2229.1	0.052	22146	3844	2387.0	0.056	18392	3802	2990.4	0.065
To other developing countries	22823	1518	4077.6	0.067	22146	1437	3917.1	0.068	18392	1343	4272.8	0.070
Foreign firms	1205	848	13076.1	0.151	1181	833	14045.4	0.159	1111	797	18165.3	0.167
High wages (avg wage > 5 min. wages)	12941	3141	8126.8	0.115	12853	3091	8125.1	0.123	10978	3042	8696.3	0.123
Low wages (avg wage < 5 min. wages)	9882	1886	4380.2	0.306	9293	1789	4609.4	0.297	7414	1703	5246.8	0.298
High skill (% skilled workers > 20%)	14746	3401	7737.4	0.118	14580	3331	7821.2	0.126	12442	3284	8239.2	0.123
Low skill (% skilled workers < 20%)	8077	1626	4595.5	0.331	7566	1549	4718.1	0.319	5950	1461	5702.8	0.327
High concentration sector (CC4 > 0.5)	7496	1912	12493.8	0.159	7186	1856	12507.9	0.163	6098	1782	14301.6	0.166
Low concentration sector (CC4 < 0.5)	13327	3115	3177.9	0.204	14960	3024	3355.2	0.202	12294	2963	3342.6	0.198
Large firms (revenue > R\$10 million)	3558	2209	14381.4	0.154	3752	2251	14041.2	0.155	3765	2244	15059.6	0.158
Small firms (revenue < R\$10 million)	19265	2818	716.3	0.212	18394	2629	667.2	0.214	14627	2501	638.1	0.211

Note: (1) Considers only firms that export.

Sector	1995				1996				1997			
	Number of Firms		Average Exports ⁽¹⁾		Number of Firms		Average Exports ⁽¹⁾		Number of Firms		Average Exports ⁽¹⁾	
	Total	Exporters	Value (US\$ 1000)	% of Revenues	Total	Exporters	Value (US\$ 1000)	% of Revenues	Total	Exporters	Value (US\$ 1000)	% of Revenues
15 - Foodstuffs and Beverages	3744	518	13905.3	0.259	3570	509	14581.0	0.246	3014	458	15510.7	0.243
Processed Meat	440	73	10249.5	0.235	423	65	12026.0	0.228	402	64	10805.7	0.271
Oils and Fats	101	50	48552.0	0.440	90	40	67583.8	0.439	74	32	73945.3	0.401
Sugar	160	79	12986.1	0.191	159	78	8863.6	0.194	131	60	14422.8	0.257
Processed Coffee	226	17	22782.0	0.347	213	20	24310.2	0.378	173	14	30684.0	0.408
Beverages	350	38	2327.4	0.037	349	37	2631.5	0.064	311	37	2164.0	0.045
16 - Tobacco	42	22	36303.9	0.612	40	22	46300.5	0.564	37	21	65763.6	0.656
17 - Textiles	1240	287	3334.9	0.131	1187	291	3393.6	0.145	1101	288	3408.1	0.127
18 - Apparel	1446	133	1199.5	0.120	1276	126	1041.2	0.098	925	113	908.8	0.125
19 - Leather and Footwear	996	405	4271.8	0.417	934	391	5062.1	0.422	809	381	4903.3	0.400
20 - Wood	1105	324	2113.6	0.469	958	278	2087.0	0.468	734	268	2330.8	0.487
21 - Pulp and Paper	605	129	18236.0	0.097	594	127	13142.8	0.104	507	125	14236.5	0.126
22 - Publishing, Records and Movies	1293	65	760.6	0.022	1480	51	758.8	0.022	1077	48	575.0	0.029
23 - Oil Derivat., Alcohol and Nuclear Fuels	154	23	31030.0	0.115	155	25	6315.4	0.154	146	25	4119.1	0.127
24 - Chemicals and Pharmaceuticals	1770	487	5237.4	0.123	1673	492	5035.2	0.127	1480	484	5669.3	0.134
Pharmaceuticals	305	87	2436.6	0.124	276	87	3041.4	0.129	250	76	4419.0	0.161
Chemicals	1465	400	5846.5	0.123	1397	405	5463.5	0.127	1230	408	5902.2	0.129
25 - Rubber and Plastic Products	1673	330	2406.5	0.051	1694	328	2500.7	0.061	1445	318	2526.8	0.059
26 - Non-metallic Mineral Products	1162	185	3452.9	0.197	1140	192	3335.8	0.183	861	174	4338.3	0.192
27 - Basic Metallurgy	851	257	23687.7	0.216	819	249	23474.7	0.221	647	235	22248.8	0.220
28 - Fabricated Metal Products	1724	337	2016.7	0.095	1666	336	2104.1	0.092	1315	325	2327.8	0.093
29 - Machinery and Equipment ⁽²⁾	1663	616	3907.3	0.101	1673	591	4089.4	0.118	1515	601	4437.4	0.122
30 - Office Equipment (incl. Computers)	188	22	9381.4	0.084	192	30	10311.9	0.087	173	39	7490.0	0.091
31 - Electric Machinery and Materials	632	204	3053.6	0.093	615	178	3302.1	0.089	536	176	3467.2	0.082
32 - Electronic Mat. & Communic. Equip.	362	102	3112.3	0.089	345	103	3535.8	0.081	308	99	4647.5	0.095
33 - Medical and Precision Mach. & Equip.	285	84	2219.8	0.104	272	77	3392.5	0.100	231	75	3675.6	0.089
34 - Cars, Buses, Trucks and Parts	523	206	18683.0	0.105	526	205	20218.9	0.104	485	221	24981.7	0.118
35 - Other Transport. Equip. and Materials	195	48	8800.6	0.134	195	52	8277.3	0.172	155	38	23441.7	0.086
36 - Furniture and Other Miscellan. Prod.	1169	243	1548.6	0.289	1139	227	1637.6	0.307	886	233	1773.9	0.285

Notes: (1) Considers only firms that export.

(2) Includes arms and home appliances, except radios and TVs.

set of independent variables was used in both regressions, namely:¹⁵

- The log of the firm's revenue (LREV), measured in million reais, used as a proxy of firm size.
- The firm's capital intensity, measured as the ratio of total assets to revenues (ASSREV). Information on both revenues and assets was obtained from SRF/MF (Federal Revenue Service).
- A dummy variable equal to one in the case of foreign companies (OWN=1) and zero otherwise. Information on firm ownership was obtained from the Central Bank census of foreign companies and refers to their status in 1995.
- A term capturing cross-effects of size and ownership (OREV = OWN*LREV).
- The average wage in the four-digit sector to which the firm belongs (WAGE).
- The proportion of skilled workers in total labor force in each four-digit sector (SKILL). A worker is considered skilled if he or she has more than complete primary education.
- The ratio of the average wage of skilled workers in each four-digit sector to the average wage in the sector (SWAGE). It was used as a proxy of the relative productivity of these workers. Information on wages (WAGE), the proportion of skilled workers (SKILL) and their relative wage (SWAGE) was obtained from the 1996 RAIS (Annual Survey of Social Information). There are 266 different sectors in the four-digit CNAE (National Economic Activity Classification) classification used in the analysis.
- The share of the largest four firms in the overall revenues of each four-digit sector (CC4).
- An index of sector capacity utilization (ICU). This information was obtained from the "Sondagem Conjuntural" survey of the Getulio Vargas Foundation and is measured at the two-digit sector level. The index was built fixing capacity utilization in all sectors in 1995 at 100.
- An index of direct and indirect labor content of output at the four-digit sector level (FW). Data for this variable

15 Descriptive statistics for the variables used in the right-hand side of the regressions are presented in Table A.1, complementing the information presented in Table 6.

and the next (FR) was obtained from Moreira and Najberg (1998).

- A similar index of direct and indirect natural resource content of output at the four-digit sector level (FR).
- A set of 21 dummy variables (D16 to D36), one for each two-digit sector, except for food products, which was used as a base. These dummies capture fixed two-digit sector effects.
- Dummy variables for years 1996 (D1996) and 1997 (D1997) that capture fixed year effects such as inflation and of other factors (e.g., level of domestic and international economic activity), to the extent that they affect all sectors equally.

The estimation strategy for both the probit and the OLS regressions consisted of first estimating the model without sector dummies (Model A), next with these dummies (Model B) and finally to clear this second model of the independent variables that did not show statistical significance (Model C), ex-post testing their joint significance with a likelihood ratio test.¹⁶

In Table 7 we present the probit models. Model A shows that both company size (revenues) and ownership are significant determinants of the probability of a firm being an exporter – with this probability increasing with size and being larger for foreign than for national companies. Furthermore, it shows that the difference between the two types of companies declines as size increases, and that the likelihood of a firm being an exporter is higher the larger the share of unskilled workers in the workforce. The model shows great statistical significance and good explanatory power, as indicated for the fact that it correctly predicts 85.1% of the responses.

Inclusion of fixed two-digit sector effects does not alter the above results (Model B), other than by reducing the coefficient of SKILL in absolute value by a third. Those estimates also show that in most sectors – except for Publishing, Records and Movies (22) and Oil Derivatives, Alcohol and Nuclear Fuels (23) – the probability of a firm being an exporter is larger than for Foodstuffs and Beverages (15). In addition, the model shows that, controlling for other effects, this probability is higher in sectors that produce goods with a high labor content (FW) and that are relatively concentrated (CC4).

¹⁶ A problem common to the several models discussed in this section and the following was the multicollinearity among three of the labor market variables: WAGE, SKILL and SWAGE. The first two, in particular, have a correlation coefficient of 0.83. This has, in practice, precluded the use of more than one of these three variables in any single model. In most cases, the best fit was obtained using SKILL as an independent variable. In others we used WAGE. SWAGE was not used in any of the selected models.

Table 7
Probit Model for Probability of Firm Being an Exporter⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCPT	-11.7730	0.2749	-9.0132	0.3499	-8.7675	0.1007
LREV	0.4433	0.0044	0.4782	0.0048	0.4781	0.0047
ASSREV	0.0000	0.0000	0.0000	0.0000		
OWN	1.9892	0.2418	2.1839	0.2470	2.1834	0.2469
OWN*LREV	-0.0732	0.0151	-0.0918	0.0154	-0.0917	0.0154
SKILL	-1.5720	0.0610	-1.0431	0.1011	-1.0365	0.1000
CC4	0.2107	0.0334	0.1436	0.0393	0.1384	0.0389
ICU	0.0494	0.0026	0.0019	0.0031		
FW	0.0629	0.0868	1.9977	0.4894	1.7770	0.1590
FR	-2.3583	0.0864	-0.0062	0.2578		
D1996	0.0294	0.0160	-0.0426	0.0167	-0.0467	0.0160
D1997	-0.0904	0.0163	-0.0445	0.0169	-0.0429	0.0164
D16			1.3060	0.1488	1.2979	0.1478
D17			0.6684	0.0715	0.6679	0.0343
D18			-0.0609	0.0955		
D19			1.2885	0.0562	1.3168	0.0332
D20			1.0941	0.0589	1.1318	0.0357
D21			0.1439	0.0737	0.1820	0.0462
D22			-0.5244	0.0806	-0.4929	0.0563
D23			-0.3139	0.1274	-0.3365	0.0847
D24			0.6444	0.0589	0.6563	0.0358
D25			0.6683	0.0811	0.6618	0.0345
D26			0.4611	0.0647	0.4760	0.0363
D27			0.8773	0.0761	0.8802	0.0388
D28			0.3740	0.0651	0.4144	0.0318
D29			1.0627	0.0609	1.0808	0.0303
D30			0.5529	0.1207	0.5438	0.0883
D31			0.8220	0.0671	0.8373	0.0425
D32			0.8948	0.1059	0.8898	0.0628
D33			1.1998	0.1079	1.1892	0.0653
D34			0.8526	0.0661	0.8748	0.0430
D35			0.4405	0.0895	0.4632	0.0745
D36			0.6300	0.0579	0.6640	0.0343
% Corr. Pred. Resp.	85.1%		87.1%		87.2%	
Pseudo R ² (LRI)	0.291		0.332		0.332	
Number Observ.	63053		63053		63352	

Note: (1) In all cases, the LR and score tests for the null hypothesis that the slopes are jointly equal to 0 have p-values of less than 0.01%.

There is no significant change in coefficients when we drop non-statistically significant variables from model B, attesting to the robustness of most estimators. In preferred model C, the probability of being an exporter increases with size, manufacturing concentration and labor content, and falls with the proportion of skilled workers. Moreover, it is higher for foreign firms than for national ones, even though this difference is smaller for large firms.¹⁷ The preferred model correctly predicts 87.2% of the responses.

To assess the impact of each variable on the likelihood of a firm being an exporter we compare this probability when the value of each right-hand-side variable is fixed individually at its median, its 9th decile, and its 1st decile. The resulting probabilities are presented in Table 8 for each two-digit sector, in 1997, separately for national and foreign companies.

Looking at the probability of a firm being an exporter when all variables are fixed at their medians, we see that there are sizable differences between foreign and national firms and across sectors. For national firms, this probability is lower than 25% for 17 of the 22 sectors, whereas for foreign companies it is higher than 25% in 18 sectors.¹⁸ The results also indicate that if all manufacturing firms and sectors had attributes (size, skill content, and so forth) equal to the industry median, five sectors would show a large proportion of exporters (25% for national and foreign firms): Tobacco, Leather and Footwear, Wood, Machinery and Equipment, and Medical and Precision Machinery and Equipment. Somewhat counter intuitively, given factor endowments, this proportion would be rather low for Apparel and Food Products and Beverages.¹⁹

Size is the variable with the larger impact on the likelihood of a firm being an exporter. This effect is particularly pronounced for national firms. For instance, a national textiles producer with annual revenues of R\$ 99 thousand (1st decile) has a chance of just 1% of being an exporter. For a national firm in the same sector and with annual revenues of R\$ 20,7 million (9th decile), this probability is equal to 61%. For a foreign firm, the corresponding probabilities are 12% and 82%, respectively. In sum, size does have a major influence on the likelihood of a firm being an exporter.

This probability is much less sensitive to the remaining variables, once fixed sector effects are controlled for. Staying with the example of a national textiles producer, we see that the

17 Comparing these results with those in Table 6, we see that while the effects of size, foreign ownership and industrial concentration on the likelihood of a firm being an exporter remain positive, that of skill content (and wage level, not shown here) turn negative.

18 Note that these probabilities are estimates and do not necessarily equal the actual proportion of exporting firms in each sector x ownership cell.

19 Keep in mind that we are controlling for differences in size and other attributes.

Table 8
Probability of Being an Exporter (Y=1) for Independent Variables Measured at their Median, 9th Decile and 1st Decile Values (National and Foreign Companies, in 1997)

Sector ⁽¹⁾	Median		9 th Decile								1 st Decile							
			LREV		SKILL		CC4		FW		LREV		SKILL		CC4		FW	
	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.
15 – Food Prod. & Beverages	0.05	0.21	0.35	0.60	0.03	0.16	0.05	0.23	0.07	0.28	0.00	0.03	0.06	0.25	0.04	0.20	0.03	0.17
16 – Tobacco	0.35	0.69	0.82	0.94	0.28	0.61	0.37	0.71	0.43	0.76	0.05	0.30	0.39	0.73	0.34	0.68	0.30	0.64
17 – Textiles	0.16	0.45	0.61	0.82	0.11	0.37	0.17	0.47	0.21	0.53	0.01	0.12	0.18	0.49	0.15	0.44	0.12	0.39
19 – Leather and Footwear	0.36	0.70	0.82	0.94	0.28	0.62	0.37	0.71	0.43	0.76	0.05	0.31	0.40	0.74	0.35	0.69	0.30	0.65
20 – Wood	0.29	0.63	0.77	0.92	0.22	0.55	0.31	0.65	0.36	0.70	0.03	0.25	0.33	0.67	0.28	0.62	0.24	0.57
21 – Pulp and Paper	0.07	0.27	0.42	0.66	0.04	0.20	0.07	0.28	0.10	0.34	0.00	0.05	0.08	0.31	0.06	0.26	0.05	0.22
22 – Publishing, Records and Movies	0.01	0.10	0.19	0.40	0.01	0.07	0.02	0.11	0.02	0.14	0.00	0.01	0.02	0.12	0.01	0.09	0.01	0.08
23 – Oil Derivat., Alcohol and Nuclear fuels	0.02	0.13	0.23	0.46	0.01	0.09	0.02	0.14	0.03	0.18	0.00	0.02	0.03	0.15	0.02	0.12	0.02	0.10
24 – Chemicals & Pharmac.	0.15	0.44	0.60	0.82	0.11	0.36	0.16	0.46	0.20	0.52	0.01	0.12	0.18	0.49	0.14	0.43	0.12	0.39
25 – Rubber & Plastic Prod.	0.15	0.45	0.61	0.82	0.11	0.36	0.16	0.46	0.21	0.53	0.01	0.12	0.18	0.49	0.15	0.43	0.12	0.39
26 – Non-met. Mineral Prod.	0.11	0.37	0.53	0.76	0.08	0.30	0.12	0.39	0.16	0.45	0.01	0.09	0.14	0.42	0.11	0.36	0.09	0.32
27 – Basic Metallurgy	0.21	0.53	0.69	0.87	0.16	0.45	0.22	0.55	0.27	0.61	0.02	0.17	0.25	0.58	0.20	0.52	0.17	0.47
28 – Fabricated Metal Prod.	0.10	0.35	0.51	0.74	0.07	0.28	0.11	0.37	0.14	0.43	0.01	0.08	0.12	0.39	0.10	0.34	0.08	0.30
29 – Machinery & Equip. (2)	0.27	0.61	0.75	0.91	0.21	0.53	0.29	0.63	0.34	0.69	0.03	0.23	0.31	0.65	0.26	0.60	0.23	0.55
30 – Office Equip. (incl. Computers)	0.13	0.40	0.56	0.78	0.09	0.32	0.14	0.42	0.17	0.48	0.01	0.10	0.15	0.44	0.12	0.39	0.10	0.34
31 – Electric Machinery and Materials	0.20	0.52	0.67	0.86	0.15	0.43	0.21	0.53	0.26	0.60	0.02	0.16	0.23	0.56	0.19	0.50	0.16	0.46
32 – Electronic Mater. and Communic. Equip.	0.21	0.54	0.69	0.87	0.16	0.45	0.23	0.56	0.28	0.62	0.02	0.18	0.25	0.58	0.20	0.52	0.17	0.48
33 – Medical and Precision Mach. & Equip.	0.31	0.65	0.79	0.92	0.24	0.57	0.33	0.67	0.38	0.72	0.04	0.26	0.35	0.69	0.30	0.64	0.26	0.60
34 – Cars, Buses, Trucks and Parts	0.21	0.53	0.68	0.87	0.15	0.45	0.22	0.55	0.27	0.61	0.02	0.17	0.24	0.58	0.20	0.52	0.17	0.47
35 – Other Transport. Equip. and Materials	0.11	0.37	0.53	0.76	0.08	0.29	0.12	0.39	0.15	0.45	0.01	0.09	0.13	0.41	0.11	0.36	0.09	0.32
36 – Furniture and Other Miscellaneous Prod.	0.15	0.45	0.61	0.82	0.11	0.37	0.17	0.47	0.21	0.53	0.01	0.12	0.18	0.49	0.15	0.43	0.12	0.39

Note: (1) Results for Apparel (sector 18) are equal to those for Foodstuffs and Beverages.

likelihood of it being an exporter increases by just 9 percentage points as its labor factor content (FW) increases from the 1st to the 9th decile; decreases by 7 percentage points as the proportion of skilled workers rises from 12.8% to 44.1% of the workforce; and increases by a mere 2 percentage points as CC4 goes from 17.9% to 74.2%. Differences across sectors regarding these changes in probabilities exist but are not very significant.

In Table 9 we present the OLS regressions for the value of a firm's exports conditional on it being an exporter ($X|Y=1$).²⁰ Without sector dummies, our model is able to explain 46.3% of the variance in export value. All variables are statistically significant, except for the 1996 dummy. The model shows that exports are inelastic to firm size for both national and foreign companies, and that this elasticity is higher for the latter (0.975 vs. 0.844). This means that as size goes up, all else the same, (i) exports come

20 Again, the high (positive) correlation between WAGE and SKILL precluded inclusion of both in the models. In this case, both variables presented coefficients with the same sign when considered together or separately – skill, with a negative coefficient, wage with a positive one. But when together in the same regression, their coefficients became much larger in absolute values, overstating the sensitiveness of the value of exports to them. Interestingly, although presenting opposite signs, the two variables presented similar levels of statistical significance. We opted for the models with SKILL as an explanatory variable, since it provides a slightly better fit. It is worth remarking, moreover, that the coefficients of the remaining variables showed to be relatively robust to these variations in model specification.

Table 9
OLS Regression for Value of Exports⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCEP	-7.2667	0.5713	-4.1820	0.6656	-3.2799	0.3860
LREV	0.8435	0.0097	0.8876	0.0096	0.8874	0.0096
ASSREV	0.0048	0.0010	0.0051	0.0010	0.0051	0.0010
OWN	-1.6805	0.3707	-0.8333	0.3589	-0.8429	0.3589
OWN*LREV	0.1310	0.0220	0.0786	0.0213	0.0793	0.0213
SKILL	-2.6070	0.1333	-1.1419	0.2035	-1.2014	0.1955
CC4	0.6322	0.0676	0.4945	0.0732	0.4849	0.0728
ICU	0.0666	0.0053	0.0090	0.0058		
FW	1.1983	0.2073	1.9679	0.9328	1.5561	0.8589
FR	3.4582	0.2049	7.6262	0.5676	7.9184	0.5470
D1996	0.0341	0.0341	-0.0504	0.0328		
D1997	-0.1966	0.0346	-0.1057	0.0334	-0.0587	0.0279
D16			0.9811	0.2048	0.9641	0.2044
D17			0.9225	0.1491	0.9852	0.1460
D18			0.4762	0.1992	0.6387	0.1581
D19			2.2913	0.1195	2.4208	0.0994
D20			1.9533	0.1198	2.0700	0.0988
D21			0.7671	0.1560	0.9096	0.1217
D22			-0.2558	0.1884		
D23			1.7402	0.2725	1.7486	0.2713
D24			1.1201	0.1295	1.2302	0.1118
D25			0.6755	0.1693	0.7407	0.1664
D26			1.3977	0.1423	1.5051	0.1310
D27			1.6540	0.1555	1.7470	0.1492
D28			0.7828	0.1422	0.9501	0.1059
D29			1.4263	0.1347	1.5518	0.1144
D30			1.1906	0.2554	1.2839	0.2508
D31			1.1080	0.1438	1.2313	0.1269
D32			1.1046	0.2130	1.2016	0.2080
D33			1.6249	0.2166	1.7066	0.2132
D34			1.2968	0.1387	1.4293	0.1154
D35			0.9848	0.1835	1.1210	0.1657
D36			1.0228	0.1233	1.1604	0.0976
Adj R ²	0.4625		0.5093		0.5091	
Number Obs.	14631		14631		14631	

Note: (1) In all regressions dependent variable is *ln* of exports.

down as a share of revenues; and (ii) the difference in export value between national and foreign firms, that is favorable to the second for firms with revenues above R\$ 362 thousand,²¹ tends to increase. The results also indicate that, controlling for size and ownership, firm export values tend to be larger in labor and natural resource intensive sectors, and in sectors that hire proportionately fewer skilled workers.²²

Including the sector dummies and excluding statistically non-significant variables we obtain Model C in Table 9. The model's adjusted R² increases by almost 4 percentage points, indicating the importance of sector specific factors not captured by the other explanatory variables. Introduction of these dummies changes somewhat the model's coefficients: the size elasticity for national companies goes up, although staying lower than that for foreign companies; the sensitivity of exports to skill content and manufacturing concentration comes down, while the impact of differences in labor and natural resource content goes up.

The dummy coefficients indicate that, all else the same, firms in all sectors export more than in the Food Products and Beverages sector. This means that firms in those other sectors have a higher propensity to export (i.e., a higher export/revenues ratio) than those in Food Products and Beverages. Take, for instance, the case of Leather and Footwear (D19). We saw in Table 6 that, on average, exporters in this sector sold less abroad than the average manufacturing exporter (in 1997, \$4903.3 vs. \$7458.3). But if we take size, ownership and the remaining effects into account, we see that the propensity to export of leather and footwear exporters is higher than in all other sectors: 11 times larger than in Food Products and Beverages, and twice as large as in Basic Metallurgy.

3.3. Decomposing the Impact on Exports

Coefficients of the probit and OLS models may be combined to measure the overall impact of each explanatory variable Z on the expected value of exports (E(X)), using the following decomposition:

$$\frac{\partial E(X)}{\partial Z} = \frac{\partial [P(Y=1) E(X | Y=1)]}{\partial Z} = \frac{\partial P(Y=1)}{\partial Z} E(X | Y=1) + P(Y=1) \frac{\partial E(X | Y=1)}{\partial Z} \quad (1)$$

21 Approximately 75% of the firms are in this situation.

22 The positive coefficient of FR indicates that a firm's propensity to export increases with the natural resource content of its output. A firm that produces goods with high natural resource content (9th decile of FR) has a propensity to export that is 2.7 times larger than that of a comparable industrial firm with an output that has a median natural resource content. This difference is much smaller (just 20%) in the case of the labor content of output.

where $Y=1$ if firm is an exporter and 0 otherwise. The interpretation of the two terms is intuitive: the first indicates the expected gain from increasing the number of exporters, keeping their average export level constant; the second, the gain from expanding the exports of existing exporters, while keeping constant the number of exporters. The first is consistent with increasing exports by enlarging the number of exporters, for instance, by engaging more small and medium enterprises in foreign trade. The second, with seeking the same goal by enlarging the export volume of firms already active in foreign trade.

Using the preferred models in Tables 7 and 9, we derived the marginal effects of each variable on (i) the probability of a firm being an exporter, (ii) the expected value of exports conditional on the firm being an exporter, and (iii) the unconditional expected value of exports. The marginal effects are assessed separately for foreign and national companies. In all cases, this is done by measuring how much these functions change with an increase in the right-hand-side variable equal to one-tenth of the inter-quartile distance of its distribution $((Q3-Q1)/10)$. The changes are measured with respect to the value of the functions when these are measured at the median value of all explanatory variables – that is, to the value of each function for the “median manufacturing firm”, which are presented at the bottom of Table 10. The results in the Table refer to the electronic materials and communications equipment sector in 1995. Several points are worth noting:

[1] The unconditional expected value of the exports of a foreign company in the electronic materials and communications equipment sector with the attributes of the manufacturing median firm is the triple of that of a comparable national company (US\$ 51,796 vs. US\$ 16,037). This is mainly the result of the much larger probability of that firm being an exporter, but the fact that it has a conditional expected value of exports ($E(X|Y=1)$) 32% larger than a similar national firm also concurs to that difference.

[2] Marginal effects are also larger for foreign than for national companies.²³

[3] The most significant marginal effect comes from changing firm size. A marginal increase in firm size raises the expected value of exports by boosting both the likelihood of it being an exporter and the expected value of its exports conditional on it being an exporter. More than two-thirds of the overall impact arise from this second effect. That is, if all manufacturing firms were to face a marginal increase in size, two-thirds of the ensuing

23 Because these effects are assessed at the same values for the independent variables, this result reflects only the effect of the ownership dummy and of the cross term of ownership and size in the regressions of Tables 7 and 9, and *not* differences in the values of the independent variables for the two groups of firms (e.g., that foreign firms in general are larger than national companies).

increase in total exports would accrue from larger export volumes of firms that were already exporting, and only one-third from an expansion in the number of exporters.

[4] The expected value of exports is higher in labor intensive sectors and in those with low proportions of skilled labor, mainly due to a higher probability of a firm in those sectors being an exporter. But the higher conditional expected value of exports is also important.

[5] As we move from sectors with low natural resources intensity to sectors that use those inputs intensively, the expected value of exports increases, fully on account of a larger export volume of firms already engaged in exporting.

[6] The marginal effect of differences in sector concentration is relatively small, with 73% of it resulting from differences in the expected value of the foreign sales of exporting firms.

We may now combine the results in Tables 6, 8 and 10 to look at the following question: which policy will tend to produce a larger increase in overall exports, increasing the number of exporters or the value of exports of firms already engaged in exporting? The answer is that the second policy is much more promising. If not, consider the following facts:

We showed in Tables 7 and 8 that (i) the likelihood of a firm being an exporter increases quite markedly with size, (ii) that this probability is larger for foreign firms than for national companies, but (iii) that this difference is small for large companies. We may infer from those results that if we manage to increase the number of exporting firms, these new exporters will tend to be mostly small and medium national companies.

In Table 9 we showed that export revenues increase with firm size, although less than proportionately, and foreign ownership. That is, large and national manufacturing exporters export a lower share of their output than, respectively, small and foreign firms engaged in exporting. In Table 6, in turn, we showed that on average manufacturing firms export 18.7% of their output. We may conclude, therefore, that there must be ample scope to increase the propensity of large national manufacturing firms to export.²⁴

Suppose now that we manage to increase by 10 the number of exporters of electronic materials and communication equipment (from Table 6, approximately a 10% increase). If all these firms are national owned and have the same characteristics of the median manufacturing firm in 1995, it follows from Table 10

24 Moreover, we showed that firms with large export/revenues ratios tend to produce natural resource intensive goods, so the scope to increase the propensity to export of firms that do not share this attribute should be particularly large.

that this initiative would have increased overall exports by about 707 thousand dollars.

Assume, alternatively, that we raise the export propensity of exporters in that same sector – which in 1995-97 stayed on average consistently below 10% – also by a tenth. That would have resulted in an increase in overall exports in 1995 of 31.7 million dollars, that is, 45 times as much as the impact of engaging 10% more firms in exporting. That same exercise, if repeated for other sectors, would generate similar results.

Therefore, it follows quite forcefully from our results that a policy that encourages large firms to export a larger share of their output will tend to have a much higher payoff, as way of larger overall exports, than one that tries to raise the number of small and medium companies engaged in exporting.

4. What Determines the Destination of Exports?

Table 10
Marginal Effects Assessed at Median Values of Continuous Variables – Total Exports (US\$, for Electronic Materials and Communications Equipment Sector in 1995)

Variable	Change in Variable = (Q3-Q1)/10	Own=0					Own=1				
		$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} \cdot E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1) \cdot \partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} \cdot E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1) \cdot \partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$
LREV	0.2760	0.042	2946	19631	4450	7397	0.042	3905	28,585	15836	19741
ASSREV	0.0788			28	6	6			38	21	21
SKILL	0.0154	-0.005	-338	-1295	-294	-631	-0.006	-590	-1,712	-948	-1538
CC4	0.0272	0.001	80	940	213	293	0.001	139	1,242	688	827
FW	0.0144	0.008	552	1608	365	917	0.010	947	2,125	1177	2124
FR	0.0054			3062	694	694			4,046	2242	2242
Prob [Y=1]		0.227					0.554				
E(X Y=1)		70744					93493				
E(X)		16037					51796				

Note: $\frac{\partial E(X)}{\partial Z} = \frac{\partial [P(Y=1) E(X|Y=1)]}{\partial Z} = \frac{\partial P(Y=1)}{\partial Z} \cdot E(X|Y=1) + P(Y=1) \frac{\partial E(X|Y=1)}{\partial Z}$.

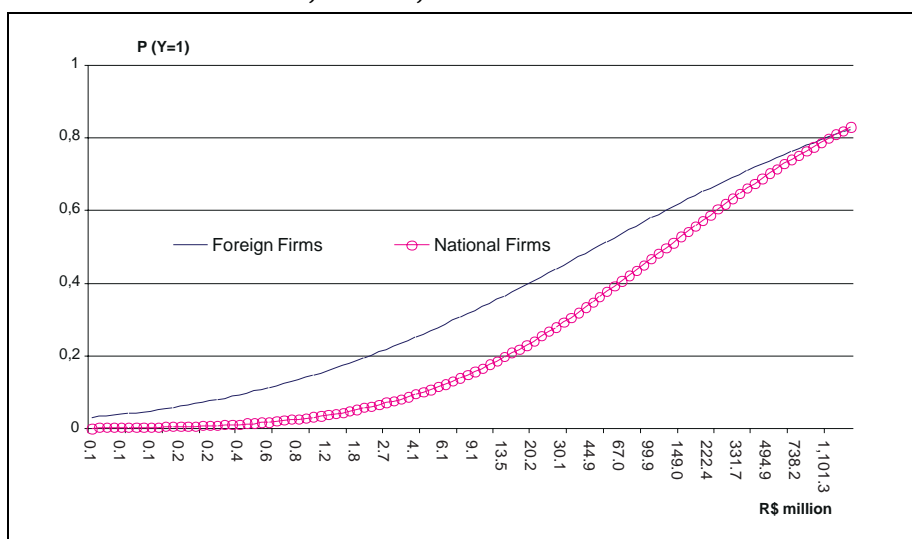
The next question we want to answer is whether there are differences in the profile of exporters active in distinct regional markets. To that end, we divided the world in four regions – the USA and Canada, Other Industrialized Countries, Latin America and Other Developing Countries – and repeated the exercises described in Section 3 to each region individually.

4.1. Exporters to the USA and Canada

The probit model for the probability of a firm being an exporter to the USA or Canada and the corresponding OLS regression for the value of their exports to those countries are presented in Tables A.2 and A.3. The results are similar to those obtained in Section 3, both in sign and magnitude, with a few noteworthy differences. First, the dependent variables in both models are less sensitive to firm size. Second, for both models there is a more marked difference, particularly for smaller firms, between national and foreign firms, with the latter showing a more substantial lead in terms of the probability of being an exporter and in terms of export revenues. This “probability gap” and its sensitiveness to size are illustrated by Chart 3, where the case of the automobile sector (cars, buses, trucks and parts) is presented. The other sectors have a similar pattern.

Third, the index of capacity utilization has a negative statistically significant coefficient in both models, suggesting that when the level of domestic activity contracts more firms export to the USA/Canada, while those already present in those markets raise their shipments. Fourth, the likelihood of a firm being an exporter to the USA or Canada is not affected by the labor or natural resource content of output in the four-digit sector to which belongs, once fixed two-digit sector effects are accounted for. For the value of exports, only the natural resource content variable is relevant, and its coefficient is only a third of that for exporters in general. Fifth, there are less marked cross-sector differences in export behavior among firms exporting to USA/Canada than among exporters in general, particularly in regards to their propensity to export.

Chart 3
Probability of Being an Exporter to the USA and Canada as a Function of Size (operational income in R\$)
Cars, Buses, Trucks and Parts



In Table 11 we show that the likelihood of a national exporter with the attributes of the median manufacturing firm being an exporter to the USA or Canada ranges from a low 3.7% in the case of oil derivatives, alcohol and nuclear fuels, to a high 52.0% for wood.²⁵ The corresponding figures for a foreign owned exporter are 6.6% and 62.7%. We also see in Table 11 that this probability is unambiguously higher for large national and foreign owned firms, for firms in sectors with low shares of skilled workers in their labor forces, and for low levels of capacity utilization. But the reverse is not always true. That is, whereas in all sectors raising capacity utilization and the proportion of skilled workers lowers the probability of the exporter being present in the USA/Canada market, lowering firm size may or not reduce this probability.²⁶

Table 11
Probability of Being an Exporter to the USA or Canada, Conditional on the Firm Being an Exporter, Estimated with Explanatory Variables Measured at their Median and their 9th and 1st Deciles (National and Foreign Companies, in 1997)

Sector *	Median		9th Decile						1st Decile					
			LREV		SKILL		ICU		LREV		SKILL		ICU	
	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.
15 – Food Prod. & Beverages	22.1	28.4	28.7	34.4	18.0	23.2	20.6	26.9	27.0	33.9	24.7	31.4	24.8	30.9
16 – Tobacco	26.6	41.8	47.3	60.6	21.4	34.6	25.4	40.5	19.7	33.8	29.8	46.0	28.7	44.0
17 – Textiles	13.9	23.3	26.5	36.5	10.7	18.3	13.1	22.2	10.6	19.5	16.0	26.4	15.4	25.1
19 – Leather and Footwear	48.4	61.5	65.2	75.4	41.8	54.3	46.5	60.0	48.9	60.4	52.0	65.4	51.5	63.9
20 – Wood	52.0	62.7	65.0	74.1	45.5	55.7	49.9	61.0	58.9	66.4	55.6	66.4	55.5	65.3
21 – Pulp and Paper	6.8	12.2	13.9	20.0	5.0	9.1	6.3	11.5	5.2	10.4	8.0	14.2	7.7	13.4
22 – Publishing, Records and Movies	15.4	19.4	19.0	22.4	12.2	15.5	14.1	18.2	20.2	25.6	17.3	21.8	17.6	21.6
23 – Oil Derivat., Alcohol and Nuclear Fuels	3.7	6.6	7.3	10.6	2.7	4.8	3.4	6.2	3.0	6.2	4.5	7.9	4.3	7.5
24 – Chemicals & Pharmac.	15.8	25.5	28.6	38.7	12.3	20.2	14.8	24.4	12.7	22.1	18.0	28.7	17.5	27.4
25 – Rubber & Plastic Prod.	6.7	13.5	16.4	25.1	4.8	10.0	6.2	12.8	3.9	9.4	7.9	15.8	7.5	14.7
26 – Non-met. Mineral Prod.	31.6	40.3	41.6	49.8	26.3	34.0	29.8	38.6	36.4	44.7	34.7	43.9	34.7	43.0
27 – Basic Metallurgy	30.7	42.6	45.9	56.6	25.4	35.8	29.2	41.1	29.6	41.1	33.9	46.4	33.4	45.0
28 – Fabricated Metal Prod.	23.8	32.5	34.3	42.6	19.3	26.7	22.4	31.1	25.1	34.2	26.5	35.9	26.3	34.9
29 – Machinery & Equip. (2)	16.7	29.1	33.9	46.6	12.8	23.0	15.7	27.9	11.1	21.9	19.1	32.7	18.2	30.9
30 – Office Equip. (incl. Computers)	42.4	50.0	50.6	58.0	36.4	43.4	40.1	48.2	54.0	59.0	45.8	53.7	46.2	53.1
31 – Electric Machinery and Materials	16.6	27.5	31.3	42.5	12.9	21.8	15.6	26.3	12.4	22.6	18.9	30.9	18.2	29.4
32 – Electronic Mater. and Communic. Equip.	18.1	29.6	33.6	45.1	14.2	23.7	17.1	28.4	13.7	24.4	20.6	33.1	19.9	31.5
33 – Medical and Precision Mach. & Equip.	25.8	40.1	45.1	58.0	20.7	33.1	24.5	38.8	19.8	33.2	28.8	44.1	27.9	42.3
34 – Cars, Buses, Trucks and Parts	17.3	28.5	32.5	44.0	13.5	22.8	16.3	27.4	13.0	23.4	19.7	32.0	19.0	30.5
35 – Other Transport. Equip. and Materials	33.4	41.8	42.9	50.8	28.0	35.4	31.5	40.1	39.6	47.3	36.6	45.4	36.7	44.6
36 – Furniture and Other Miscellaneous Prod.	34.0	43.9	45.9	55.0	28.5	37.3	32.2	42.2	37.5	46.8	37.2	47.6	37.1	46.6

* Results for Apparel (sector 18) are equal to those for Foodstuffs and Beverages.

25 The unconditional probability of the firm being an exporter to the USA or Canada may be obtained multiplying the values in Table 11 by the corresponding figures in Table 8.

26 Note that the probability of a firm being an exporter to the USA or Canada conditional on it being an exporter is a ratio of probabilities. The change in each of these probabilities, as a result of the same variation in an explanatory variable, depends not only on the corresponding coefficient in the probit model, but also on the slope of the cumulative normal distribution at the value at which each probability is being assessed.

The marginal effects on exports to the USA and Canada of changes in the explanatory variables for a food and beverages firm with the attributes of a median manufacturing firm are shown in Table 12, where definitions are the same as in Table 10. Note, initially, that the likelihood of a national food and beverages firm with these attributes being an exporter to the USA or Canada is only a fourth of a similar foreign firm. However, if such a national firm does export to that market, it may be expected to export more than the corresponding foreign firm.

Again, size is the variable with the largest marginal effect on the expected value of exports, followed by SKILL. As before, ASSREV is not an economically relevant variable. The index of capacity utilization, that did not appear relevant in Section 3, shows to have only a small influence on the unconditional value of exports to the USA and Canada. The same applies to industrial concentration and the natural resources content of output.

In the case of foreign firms, the expansion in export volumes of firms already engaged in exporting resulting from a marginal increase in firm size is twice as important as that of rising the proportion of exporters. But for national firms the two effects have similar magnitudes. This second result is mostly the consequence of the very low probability of a national food and beverages firm with the attributes of the median manufacturing firm being an exporter to the USA or Canada, which transforms the relatively high increase in the conditional value of exports into a small change in the unconditional expected value. This highlights an important qualification to the conclusion reached at the end of Section 3: a policy targeted at increasing the propensity to export of firms already engaged in exporting can only be expected to produce a substantial increase in aggregate exports if the number of such exporters is not very low.

Table 12
Marginal Effects Assessed at Median Values of Continuous Variables - Exports to the USA and Canada (US\$, for Food and Beverages Sector in 1995)

Variable	Change in Variable = (Q3-Q1)/10	Own=0					Own=1				
		$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{\partial E(X Y=1)}$	$\frac{\partial E(X)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{\partial E(X Y=1)}$	$\frac{\partial E(X)}{\partial Z}$
REV	0.2760	0.011	615	12,665	574	1188	0.020	925	11,809	2091	3016
ASSREV	0.0788			12	1	1			10	2	2
SKILL	0.0154	-0.002	-96	-758	-34	-130	-0.005	-217	-626	-111	-328
CC4	0.0272	0.000	0	81	4	4	0.000	0	66	12	12
ICU	2.5000	0.000	-14	-691	-31	-45	-0.001	-32	-571	-101	-133
FR	0.0054			828	37	37			683	121	121
Prob[Y=1]		0.045					0.177				
E(X Y=1)		55787					46061				
E(X)		2526					8156				

Note: $\frac{\partial E(X)}{\partial Z} = \frac{\partial [P(Y=1) E(X|Y=1)]}{\partial Z} = \frac{\partial P(Y=1)}{\partial Z} E(X|Y=1) + P(Y=1) \frac{\partial E(X|Y=1)}{\partial Z}$.

4.2. Exporters to Other Industrialized Countries

In Tables A.4 and A.5 we present, respectively, our probit and OLS models for the likelihood of a firm being an exporter to industrialized countries other than the USA and Canada and for the value of exports of a manufacturing firm conditional on it being an exporter to one of these countries. The coefficients of LREV, OWN and OREV in the probit model are very similar to those obtained for the USA/Canada. As can be seen in Chart 4, the “probability gap” in favor of foreign firms (cars, buses, trucks and parts) tends to be even higher than that of the USA/Canada model, but assumes a similar pattern, tending to disappear for large firms. Differently, though, from the USA/Canada case, the model of other industrialized countries (Table A.4) presents a relatively low coefficient for SKILL and a positive coefficient for ICU. In the OLS model, the most interesting results are the zero coefficient of OREV and the positive coefficient of OWN, meaning that higher propensity of foreign firms to export is constant for all firm sizes. The large coefficient of FR is also noteworthy.

In Table 13 we show that the likelihood of an exporter with the attributes of the median manufacturing firm being present in the market of an industrialized country other than the USA or Canada is relatively high, ranging from 11.5% to 100% in the case of a national exporter, and from 26.6% to a 100% for a foreign firm engaged in exporting. In most cases, this probability is higher for both large and small firms than for the median firm. The direction of change is also ambiguous when we raise or lower the proportion of skilled workers in the labor force.

The decomposition of marginal effects, presented in Table 14, is very similar to that obtained for the USA and Canada. Local

Chart 4
Probability of Being an Exporter to Other Industrialized Countries as a Function of Size (operational income in R\$)
Cars, Buses, Trucks and Parts



Table 13
Probability of Being an Exporter to Other Industrialized Countries,
Conditional on the Firm Being an Exporter, Estimated with Explanatory
Variables Measured at their Median and their 9th and 1st Deciles
(National and Foreign Companies, in 1997)

	<i>Median</i>		<i>9th Decile</i>						<i>1st Decile</i>					
			<i>LREV</i>		<i>SKILL</i>		<i>ICU</i>		<i>LREV</i>		<i>SKILL</i>		<i>ICU</i>	
	<i>Nat.</i>	<i>For.</i>	<i>Nat.</i>	<i>For.</i>	<i>Nat.</i>	<i>For.</i>	<i>Nat.</i>	<i>For.</i>	<i>Nat.</i>	<i>For.</i>	<i>Nat.</i>	<i>For.</i>	<i>Nat.</i>	<i>For.</i>
15 - Food Prod. & Beverages *	38.4	55.8	40.9	52.6	42.3	59.0	40.6	58.1	57.5	90.3	36.7	54.5	36.8	54.2
16 - Tobacco	39.1	62.4	58.1	74.6	39.1	61.2	41.2	64.5	35.6	65.1	39.4	63.3	37.7	60.9
17 - Textiles	23.1	42.2	36.2	52.1	23.4	41.6	24.6	44.3	21.6	47.2	23.0	42.7	22.0	40.8
18 - Apparel	70.7	83.9	60.1	68.9	80.5	91.4	73.7	86.2	100.0	100.0	66.4	80.6	68.5	82.2
19 - Leather and Footwear	59.8	78.8	72.2	84.5	61.7	79.4	62.0	80.5	68.9	93.9	59.1	78.9	58.2	77.6
20 - Wood	80.1	91.3	80.3	88.8	85.7	94.5	82.3	92.6	100.0	100.0	77.7	90.1	78.5	90.3
21 - Pulp and Paper	26.6	44.1	34.1	47.2	28.3	45.2	28.3	46.2	32.4	61.2	25.9	43.8	25.4	42.6
22 - Publishing, Records and Movies	100.0	100.0	75.7	78.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
23 - Oil Derivat., Alcohol and Nuclear Fuels	26.2	41.9	28.7	39.0	29.0	44.5	28.0	44.1	38.8	70.3	25.0	40.8	25.0	40.3
24 - Chemicals & Pharmac.	31.1	51.1	43.2	58.7	32.2	51.2	32.9	53.2	33.3	62.0	30.7	51.3	29.8	49.6
25 - Rubber & Plastic Prod.	11.5	26.6	23.4	38.4	11.3	25.4	12.5	28.3	8.3	25.1	11.8	27.4	10.9	25.4
26 - Non-met. Mineral Prod.	49.0	67.2	54.0	66.8	52.8	69.9	51.4	69.4	68.7	98.1	47.4	66.2	47.3	65.7
27 - Basic Metallurgy	25.5	46.1	41.0	57.9	25.6	45.2	27.2	48.3	22.7	49.0	25.6	46.9	24.4	44.7
28 - Fabricated Metal Prod.	30.4	49.3	39.8	54.1	32.1	50.1	32.3	51.4	35.7	64.9	29.8	49.1	29.2	47.8
29 - Machinery & Equip. (2)	21.3	42.2	39.1	57.2	20.8	40.4	22.8	44.3	15.8	39.7	21.7	43.4	20.2	40.8
30 - Office Equip. (incl. Computers)	13.9	29.7	25.3	40.0	13.9	28.8	15.0	31.5	11.3	30.7	14.0	30.3	13.2	28.4
31 - Electric Machinery and Materials	19.4	38.5	34.4	51.2	19.2	37.3	20.8	40.6	15.6	38.7	19.6	39.4	18.4	37.1
32 - Electronic Mater. and Communic. Equip.	22.3	42.4	37.9	55.1	22.2	41.2	23.8	44.5	18.6	43.3	22.5	43.3	21.2	40.9
33 - Medical and Precision Mach. & Equip.	27.5	50.1	46.7	64.7	27.1	48.4	29.2	52.3	21.9	48.8	27.9	51.3	26.3	48.6
34 - Cars, Buses, Trucks and Parts	36.5	57.6	50.4	66.2	37.5	57.5	38.5	59.7	38.3	67.6	36.2	57.9	35.1	56.1
35 - Other Transport. Equip. and Materials	35.5	54.7	44.3	58.5	37.6	55.9	37.5	56.9	43.4	73.6	34.7	54.4	34.1	53.1
36 - Furniture and Other Miscellaneous Prod.	52.1	70.5	58.5	71.5	55.7	72.7	54.5	72.6	70.3	98.4	50.6	69.7	50.4	69.0

* Results for sectors Apparel and for Rubber and Plastic products are equal to those for Foodstuffs and Beverages.

firms with median attributes have a probability of being an exporter several times lower than foreign companies, but the conditional expected value of their exports is not much smaller. Size is once more the variable with the largest marginal effect. For foreign firms, increasing the propensity to export of firms already present in the market of industrialized countries other than the USA and Canada accounts for 69% of this effect. The expected value of exports by foreign firm to those markets is also highly sensitive to their natural resources content. For a national firm with median attributes, these effects are much smaller than for a foreign firm.

The impact of size on the unconditional expected value of exports being divided in approximately equal parts between the effect on the probability of being an exporter and the propensity

Table 14
Marginal Effects Assessed at Median Values of Continuous Variables –
Exports to Other Industrialized Countries (US\$, for Food and Beverages
Sector in 1995)

Variable	Change in Variable = (Q3-Q1)/10	Own=0					Own=1				
		$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} \cdot \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{\partial E(X Y=1)} \cdot \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} \cdot \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{\partial E(X Y=1)} \cdot \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$
REV	0.2760	0.011	1006	19,498	920	1926	0.022	2372.8	23,666	5354	7726
SKILL	0.0154	-0.001	-94	0	0	-94	-0.003	-351.44	0	0	-351
CC4	0.0272	0.001	45	0	0	45	0.002	166.53	0	0	167
ICU	2.5000	0.000	39	803	38	77	0.001	146	975	221	367
FR	0.0054			4,235	200	200			5,140	1163	1163
Prob[Y=1]		0.047					0.226				
E(X Y=1)		88710					107672				
E(X)		4185					24357				

Note: $\frac{\partial E(X)}{\partial Z} = \frac{\partial [P(Y=1) E(X|Y=1)]}{\partial Z} = \frac{\partial P(Y=1)}{\partial Z} E(X|Y=1) + P(Y=1) \frac{\partial E(X|Y=1)}{\partial Z}$.

to export of firms already present in those markets. The effect of ICU, although contrary in sign to that observed in the case of the USA and Canada, is very small. Industrial concentration also has only a small marginal effect on the expected value of exports.

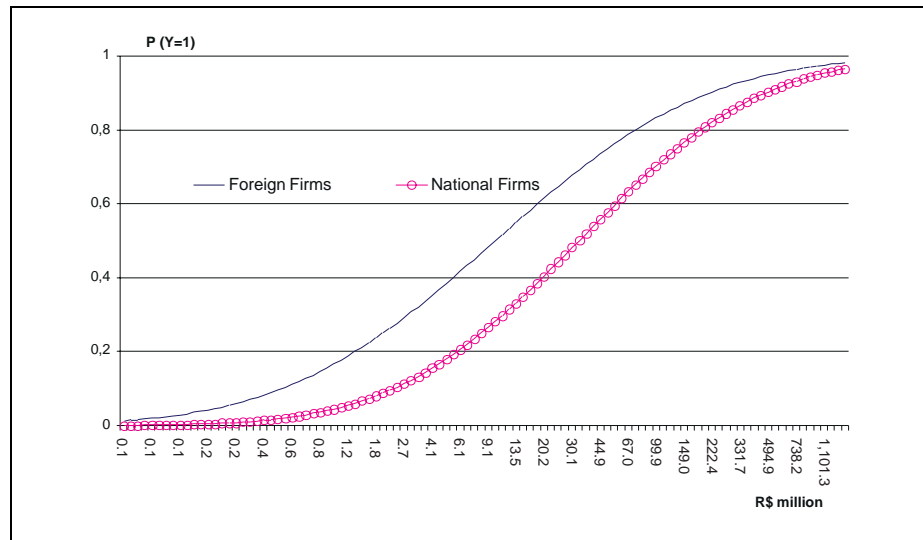
4.3. Exporters to Latin America

In Table A.6 we present the probit models for the likelihood of a firm being an exporter to Latin America. The goodness of fit is comparable to the other models, and the sign and values of the various coefficients are in general also similar to the models discussed before. The two noteworthy differences are the negative coefficient of FR (natural resource content of output) and the lower absolute value of the coefficients of OWN and OREV. The first result is consistent with the fact that Brazil exports more sophisticated, less natural resource-intensive manufacturing goods to its trade partners in Latin America.²⁷ The second indicates that the ownership effect and, therefore, the “probability gap” are more resilient to increases in firm size than for exporters to other markets – that is, even for large firms the likelihood of a foreign company being an exporter to Latin America is substantially higher than that of a national firm (see Chart 5 below, for the case of Cars, Buses, Trucks and Parts).

Note, in addition, that the index of capacity utilization has a negative statistical significant coefficient, suggesting that a larger proportion of firms export to Latin America when the domestic economy cools down. It is also interesting to observe that, as in Table 7, in all sectors, but for Publishing, Records and

27 Note that the coefficient of SKILL is also lower in absolute terms, indicating that exporters to Latin America tend to rely less intensively on cheap labor.

Chart 5
Probability of Being an Exporter to Latin America as a
Function of Size (operational income in R\$)
Cars, Buses, Trucks and Parts



Movies (22) and Oil Derivatives, Alcohol and Nuclear Fuels (23), firms have a higher probability of being an exporter than in the Food and Beverages sector.

As shown in Table 15, our model predicts that in 15 of the 22 two-digit sectors the probability of a large foreign company being an exporter to Latin America is above 90%.²⁸ These probabilities are also very high for large national firms (in 16 sectors it is above 40%), confirming the results in Table 6, which indicate Latin America as the “favorite” regional market for Brazilian exporters.

The OLS regression for the (conditional) value of firm exports to Latin America is presented in Table A.7. The model shows a better fit than similar OLS models for other regions and indicates that the cross-firm variation in export values is independent of SKILL and FW and much less sensitive to differences in natural resource content than was the case of the OLS model in Section 3. The elasticity of exports with respect to size is larger for national and foreign firms than was estimated for the two regions examined before. The model also reveals that once controlling for size, ownership, capital intensity and natural resource content, Food Products and Beverages is the sector with the lowest propensity to export (together with sectors 22, 23 and 32).

The sensitivity of the expected value of firm exports to marginal changes in the right-hand-side variables is examined in Table 16, for the case of the Food and Beverages sector in 1995.

²⁸ These probabilities are in fact larger than those of similar firms being exporters to any region (Table 8), which is evidently a conceptual impossibility, arising here from the fact that the models were estimated separately, rather than through a more cumbersome system of constrained regressions.

Table 15
Probability of Being an Exporter to Latin American Countries, Estimated
with Explanatory Variables Measured at their Median and their 9th and 1st
Deciles (National and Foreign Companies, in 1997)

	Median		9th Decile						1st Decile					
			LREV		SKILL		ICU		LREV		SKILL		ICU	
	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.
15 - Food Prod. & Beverages	0.03	0.34	0.26	0.77	0.02	0.29	0.04	0.43	0.00	0.06	0.03	0.37	0.02	0.28
16 - Tobacco	0.18	0.74	0.65	0.96	0.14	0.69	0.25	0.80	0.01	0.31	0.20	0.76	0.14	0.68
17 - Textiles	0.13	0.67	0.58	0.94	0.11	0.62	0.19	0.75	0.01	0.25	0.15	0.70	0.10	0.61
18 - Apparel	0.03	0.34	0.26	0.77	0.02	0.29	0.04	0.43	0.00	0.06	0.03	0.37	0.02	0.28
19 - Leather and Footwear	0.18	0.73	0.65	0.96	0.14	0.68	0.24	0.80	0.01	0.31	0.20	0.76	0.14	0.67
20 - Wood	0.15	0.69	0.60	0.95	0.12	0.64	0.20	0.76	0.01	0.27	0.16	0.72	0.11	0.63
21 - Pulp and Paper	0.05	0.48	0.38	0.86	0.04	0.42	0.09	0.57	0.00	0.12	0.06	0.51	0.04	0.41
22 - Publishing, Records and Movies	0.00	0.12	0.08	0.48	0.00	0.09	0.01	0.17	0.00	0.01	0.00	0.14	0.00	0.09
23 - Oil Derivat., Alcohol and Nuclear Fuels	0.00	0.15	0.10	0.54	0.00	0.12	0.01	0.21	0.00	0.02	0.01	0.17	0.00	0.11
24 - Chemicals & Pharmac.	0.11	0.62	0.52	0.92	0.08	0.56	0.16	0.70	0.01	0.21	0.12	0.65	0.08	0.55
25 - Rubber & Plastic Prod.	0.15	0.70	0.61	0.95	0.12	0.65	0.22	0.78	0.01	0.28	0.17	0.73	0.12	0.64
26 - Non-met. Mineral Prod.	0.09	0.58	0.48	0.91	0.07	0.52	0.13	0.66	0.00	0.18	0.10	0.61	0.06	0.51
27 - Basic Metallurgy	0.13	0.67	0.58	0.94	0.11	0.62	0.19	0.75	0.01	0.25	0.15	0.70	0.10	0.61
28 - Fabricated Metal Prod.	0.09	0.58	0.48	0.91	0.07	0.52	0.13	0.67	0.00	0.18	0.10	0.61	0.07	0.52
29 - Machinery & Equip. (2)	0.23	0.79	0.72	0.97	0.19	0.75	0.31	0.85	0.02	0.38	0.26	0.81	0.18	0.74
30 - Office Equip. (incl. Computers)	0.05	0.47	0.38	0.86	0.04	0.42	0.08	0.56	0.00	0.12	0.06	0.50	0.04	0.41
31 - Electric Machinery and Materials	0.17	0.72	0.63	0.96	0.13	0.67	0.23	0.79	0.01	0.30	0.19	0.74	0.13	0.66
32 - Electronic Mater. and Communic. Equip.	0.11	0.62	0.52	0.92	0.08	0.56	0.16	0.70	0.01	0.21	0.12	0.65	0.08	0.55
33 - Medical and Precision Mach. & Equip.	0.24	0.80	0.73	0.98	0.20	0.76	0.32	0.86	0.02	0.40	0.27	0.82	0.19	0.75
34 - Cars, Buses, Trucks and Parts	0.18	0.73	0.65	0.96	0.14	0.68	0.24	0.80	0.01	0.31	0.20	0.76	0.14	0.67
35 - Other Transport. Equip. and Materials	0.06	0.49	0.40	0.87	0.04	0.43	0.09	0.58	0.00	0.13	0.07	0.52	0.04	0.42
36 - Furniture and Oother Miscellaneous Prod.	0.10	0.60	0.51	0.92	0.08	0.55	0.15	0.69	0.01	0.20	0.11	0.63	0.07	0.54

Table 16
Marginal Effects Assessed at Median Values of Continuous Variables -
Exports to Latin America
(US\$, for Food and Beverages Sector in 1995)

Variable	Change in Variable = (Q3-Q1)/10	Own=0						Own=1				
		$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{\partial E(X Y=1)} \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{\partial E(X Y=1)} \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$	
REV	0.2760	0.027	494	4,722	506	999	0.041	753	5,537	1628	2381	
ASSREV	0.0788			7	1	1			7	2	2	
SKILL	0.0154	-0.002	-37	0	0	-37	-0.004	-69	0	0	-69	
CC4	0.0272	0.002	32	501	54	86	0.003	59	495	146	204	
ICU	2.5000	0.000	-8	0	0	-8	-0.001	-16	0	0	-16	
FW	0.0144	0.006	102	0	0	102	0.010	186	0	0	186	
FR	0.0054	-0.001	-15	253	27	12	-0.002	-28	250	74	45	
Prob[Y=1]		0.107					0.294					
E(X Y=1)		18497					18288					
E(X)		1982					5379					

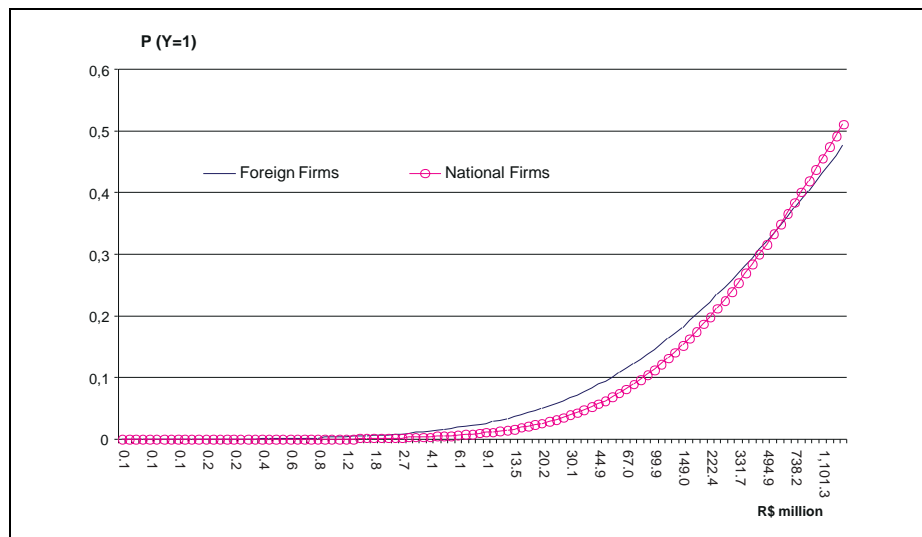
Note: $\frac{\partial E(X)}{\partial Z} = \frac{\partial [P(Y=1) E(X|Y=1)]}{\partial Z} = \frac{\partial P(Y=1)}{\partial Z} E(X|Y=1) + P(Y=1) \frac{\partial E(X|Y=1)}{\partial Z}$.

Taking a company with the attributes of a median manufacturing firm, we note that (i) the probability of a foreign firm being an exporter is less than three times larger than that for a comparable national-owned company, a smaller ratio than was the case for the USA/Canada and for the Other Industrialized Countries markets; and (ii) the conditional expected value of exports is essentially the same for national and foreign firms, being much smaller than the corresponding figures for the USA/Canada and Other Industrialized Countries. The largest marginal effect is again that of size, with its decomposition into the increase in the proportion of exporters and in their propensity to export following along the same lines described in the case of the USA/Canada and Other Industrialized Countries.

4.4. Exporters to Developing Countries Outside Latin America

The probit and OLS models for exports to Developing Countries Outside Latin America are presented in Tables A.8 and A.9, and show a number of noteworthy differences when compared to the models examined before. First, the probit model has the most negative intercept among all similar models examined here, indicating the low probability of a Brazilian firm, national or foreign, being an exporter to those markets. This conclusion is supported by Chart 6 and by the figures in Table 17. The former, using Cars, Buses, Trucks and Parts as the representative sector, shows not only the low export probability of both types of firms, but also a smaller “probability gap”, with large national firms even having a higher probability of exporting to these markets than similar foreign companies. The latter show the conditional probability of a firm being present in those markets, given that it is an

Chart 6
Probability of Being an Exporter to Other Developing Countries as a Function of Size (operational income in R\$)
Cars, Buses, Trucks and Parts



exporter. The only three sectors in which this conditional probability is above 30% for national and foreign companies are Oil Derivatives, Alcohol and Nuclear Fuels (23), Medical and Precision Machinery and Equipment (33), and Office Equipment (30).

Second, the likelihood of a firm being an exporter to these developing countries is more sensitive to large changes in size, skill and the natural resource content of output than the probabilities of firms being exporters in general. In this regard, note in Table 17 that when size and natural resource content are raised to their 9th decile values, and skill brought down to its 1st decile, the conditional probability of a firm with the attributes of a median firm exporting to these other developing countries goes up in all sectors,²⁹ whereas the opposite is true for declines in size and natural resource content and increases in skill. Note, in particular, that the impact on this probability of changes in natural resource content is as important as that of changes in size, a result that is also apparent in Table 18.

Third, neither the natural resource or the labor content of output seem to influence firms' propensity to export, nor does the proportion of skilled workers in the labor force. Fourth, contrary to what we observed in most models prior to these, the propensity to export of firms present in these markets is larger in the Food Products and Beverages sector than in most other sectors.

In Table 18 we see that the probability of both national and foreign firms with the attributes of the median manufacturing firm exporting to developing countries outside Latin America is low. Interestingly, these results also indicate that for such firms the conditional expected value of exports is larger for national than for foreign companies. Size is again the variable with the largest marginal impact. In this case, this is more evenly distributed between increases in the probability of being an exporter and in the value of exports of firms already present in those markets. This stresses a point made earlier: increasing the propensity of firms to export will have substantial aggregate effects only when a substantial proportion of firms are engaged in that activity. In markets in which few firms are present, the two policies should be combined.

4.5. Comparing Probability Results for Different Markets

A final pair of Charts puts side by side, for both foreign and national firms (Charts 7 and 8, respectively) in "cars, buses, trucks and parts", the export probability results for the four different markets. As shown, when it comes to markets, foreign and national firms have a very similar probability ranking with a few noteworthy differences. Latin America and Other Industrial-

29 The only exception being sector 23.

Table 17
Probability of Being an Exporter to Developing Countries Outside Latin America, Conditional on the Firm Being an Exporter, Estimated with Explanatory Variables Measured at their Median and their 9th and 1st Deciles (National and Foreign Companies, in 1997)

	Median		9th Decile						1st Decile					
			LREV		SKILL		ICU		LREV		SKILL		ICU	
	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.	Nat.	For.
15 - Food Prod. & Beverages *	9.5	25.3	23.9	45.2	5.6	17.2	20.6	42.9	3.9	14.2	12.3	30.6	8.1	22.6
16 -Tobacco	18.9	45.0	48.2	73.7	12.4	34.0	31.3	59.9	6.6	23.6	23.3	51.3	17.0	42.2
17 - Textiles	10.3	28.6	29.8	54.2	6.2	19.9	19.8	43.6	3.4	14.0	13.2	34.1	8.9	26.1
18 - Apparel	0.6	3.3	3.7	12.0	0.3	1.7	1.5	6.8	0.1	0.9	0.8	4.5	0.5	2.8
19 - Leather and Footwear	16.8	42.2	45.7	71.7	10.8	31.4	28.2	56.6	5.5	21.0	20.9	48.4	15.1	39.5
20 - Wood	14.1	37.0	39.8	66.0	8.8	26.9	24.6	51.6	4.5	18.0	17.7	43.0	12.5	34.3
21 - Pulp and Paper	6.6	20.0	20.0	40.5	3.8	13.2	14.2	33.9	2.2	9.6	8.7	24.6	5.6	17.9
22 - Publishing, Records and Movies	2.2	8.3	7.9	19.9	1.1	4.9	5.8	17.1	0.6	3.6	3.1	10.9	1.8	7.2
23 - Oil Derivat., Alcohol and Nuclear Fuels	90.1	100.0	87.9	100.0	66.9	95.6	100.0	100.0	100.0	100.0	100.0	100.0	78.6	100.0
24 - Chemicals & Pharmac.	18.7	42.1	41.8	66.3	12.2	31.3	34.1	60.7	8.3	25.4	23.2	48.4	16.5	38.8
25 - Rubber & Plastic Prod.	8.2	24.7	26.1	49.9	4.8	16.8	16.2	38.3	2.5	11.2	10.7	29.8	7.1	22.4
26 - Non-met. Mineral Prod.	22.0	46.0	44.1	67.9	14.5	34.6	40.5	67.1	11.2	30.4	27.0	52.6	19.3	42.3
27 - Basic Metallurgy	17.7	41.4	42.5	67.7	11.4	30.7	31.2	58.2	7.1	23.2	21.9	47.6	15.6	38.4
28 - Fabricated Metal Prod.	4.3	15.4	16.3	36.2	2.4	9.8	9.3	26.0	1.1	6.1	5.8	19.2	3.6	13.7
29 - Machinery & Equip. (2)	14.7	37.8	40.3	66.3	9.3	27.5	25.7	52.7	4.9	18.9	18.4	43.8	13.0	35.1
30 - Office Equip. (incl. Computers)	32.6	58.9	55.3	77.4	22.7	46.5	56.9	82.1	19.8	44.5	38.9	65.7	28.9	54.7
31 - Electric Machinery and Materials	12.8	33.6	35.3	60.6	7.9	24.1	23.5	49.1	4.4	17.0	16.2	39.5	11.2	31.0
32 - Electronic Mater. and Communic. Equip.	19.7	44.3	45.2	70.0	13.0	33.4	34.4	61.7	8.3	25.9	24.3	50.7	17.5	41.2
33 - Medical and Precision Mach. & Equip.	46.4	73.7	72.4	89.6	34.8	62.3	69.5	90.4	29.1	57.8	53.2	79.2	42.5	70.3
34 - Cars, Buses, Trucks and Parts	12.2	32.8	34.6	60.1	7.5	23.3	22.4	47.8	4.1	16.1	15.5	38.6	10.7	30.2
35 - Other Transport. Equip. and Materials	3.9	14.6	15.7	35.4	2.2	9.2	8.5	24.7	1.0	5.6	5.3	18.3	3.3	13.0
36 - Furniture and Other Miscellaneous Prod.	7.9	24.1	25.6	49.3	4.6	16.3	15.6	37.5	2.4	10.8	10.3	29.1	6.8	21.9

* Results for sectors Apparel and for Rubber and Plastic products are equal to those for Foodstuffs and Beverages.

ized Countries are the markets in which both national and foreign Brazilian exporters are more likely to be present. The first market leads among large firms, whereas the latter has the edge among smaller companies. Moreover, it is worth noting that among national firms the Latin America lead begins at smaller sizes (R\$ 2,7 million against R\$ 8,2 million for foreign firms), perhaps reflecting the difficulties of medium-sized companies in accessing markets outside Latin America.

The USA/Canada market comes third for both types of firms, with the likelihood of a firm exporting to it varying with size in a pattern similar to that observed in the case of Other Industrialized Countries. There are no marked differences between

Table 18
Marginal Effects Assessed at Median Values of Continuous Variables -
Exports to Developing Countries Outside Latin America (US\$, for Food and
Beverages Sector in 1995)

Variable	Change in Variable = (Q3-Q1)/10	Own=0					Own=1				
		$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{E(X Y=1)} \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z}$	$\frac{\partial P(Y=1)}{\partial Z} E(X Y=1)$	$\frac{\partial E(X Y=1)}{\partial Z}$	$\frac{P(Y=1)}{E(X Y=1)} \frac{\partial E(X Y=1)}{\partial Z}$	$\frac{\partial E(X)}{\partial Z}$
REV	0.2760	0.013	366	7,077	299	666	0.021	373	4,978	585	959
SKILL	0.0154			28	1	1			17	2	2
ASSREV		-0.002	-61	0	0	-61	-0.005	-82	0	0	-82
CC4	0.0272	0.000	0	-289	-12	-12	0.000	0	-176	-21	-21
ICU	2.5000	0.000	13	319	13	27	0.001	18	194	23	41
FW		0.005	144	0	0	144	0.011	189	0	0	189
FR	0.0054	0.001	31	0	0	31	0.002	41	0	0	41
Prob[Y=1]		0.042					0.118				
E(X Y=1)		28830					17529				
E(X)		1218					2061				

Note: $\frac{\partial E(X)}{\partial Z} = \frac{\partial [P(Y=1) E(X|Y=1)]}{\partial Z} = \frac{\partial P(Y=1)}{\partial Z} E(X|Y=1) + P(Y=1) \frac{\partial E(X|Y=1)}{\partial Z}$.

national and foreign firms in this case, except for the probability gap already mentioned in Section 4.2. Finally, in the case of Other Developing Countries, the most striking result is the fact that small and medium firms, national or foreign, are virtually out of this market. A trait that might be linked to problems of information and especially of uncovered risk.

Chart 7
Probability of a Foreign Firm Being an Exporter to Selected
Markets as a Function of Size (operational income in R\$)
Cars, Buses, Trucks and Parts

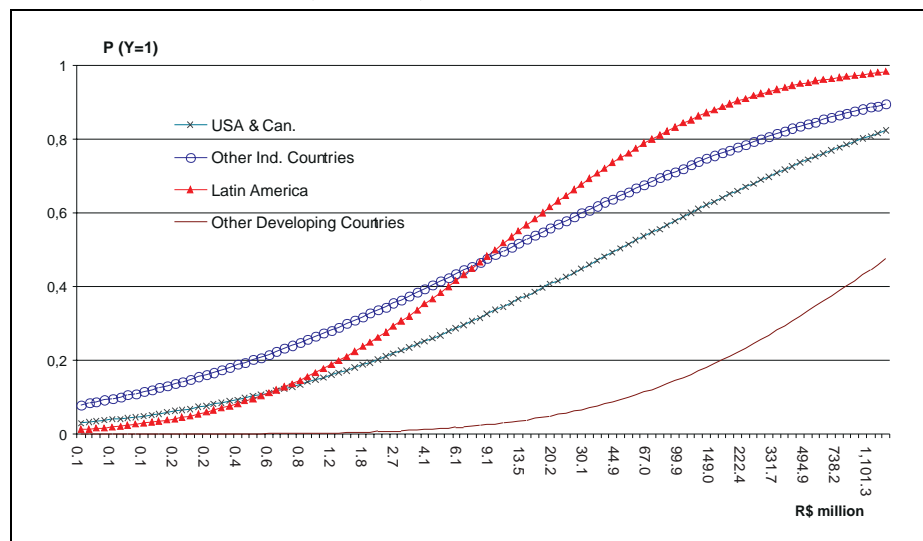
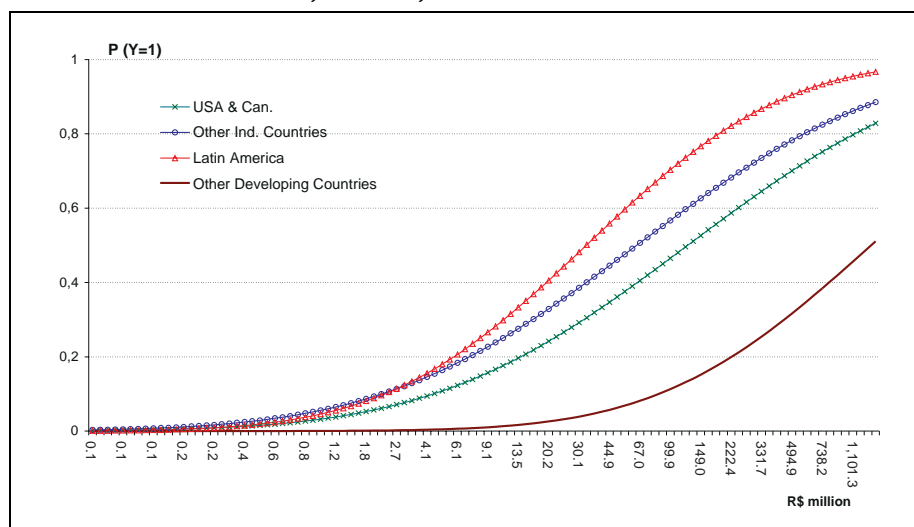


Chart 8
Probability of a National Firm Being an Exporter to Selected
Markets as a Function of Size (operational income in R\$)
Cars, Buses, Trucks and Parts



5. Final Remarks

Overall, the disappointing export performance of the 1990s can be read as the result of a gradual transition to a more market-oriented, outward-looking trade regime, under a mostly inhospitable macroeconomic environment and, as such, reflects all the teething problems involved in an effort of such magnitude. Looking ahead, though, the prospects for exports, particularly for manufacturing exports, are clearly positive. On the one hand, trade liberalization, as mentioned before, has cut drastically the anti-export bias, promoted a substantial increase in productivity and given exporters access to equipment and inputs at international prices. On the other hand, exporters, for the first time since the economy was opened up, are enjoying a macroeconomic and institutional environment – including declining interest rates, a more favorable exchange rate and an effective trade finance scheme – that is conducive to a good export performance. The results are already visible. In the last quarter of 1999, exports grew by 11.3% (against the same period in 1998) and, in the first quarter of 2000, export growth accelerated to 19.9%, led by manufacturing exports (28%).

These advances, though, should not be read as an evidence that the need for a complementary policy is not there anymore. The transformation of these initial results into a durable and sustainable export boom will require permanent action aiming at (a) allowing markets to optimize export composition, (b) expanding the export volume of existing exporters, (c) promoting entry of new exporters and (d) diversifying markets.

Our multivariate analysis support the common-sense argument that Brazil has a comparative advantage in natural resource

and labor-intensive sectors, showing that the expected value of exports is higher in these sectors and in those with low proportions of skilled labor. Yet, the composition of Brazil's exports suggests that, given the country's relative factor endowment, the share of both natural-resource and labor-intensive manufactured exports is well below its potential, possibly as a result of a degree of anti-export bias that is still present in the Brazilian economy. Removing this bias is clearly an agenda for the short-term. In the mid-to long run, policy action should aim at removing imperfections, particularly in terms of export-financing and human capital, that might hinder the development of a more capital and technology intensive export composition. The consolidation of institutions such as BNDES-EXIM and SBCE (Brazilian Export Credit Insurance Company), alongside measures to promote investment in human capital, should figure at the top of such an agenda.

The expansion of the export volume of existing exporters, according to our results, seems to be the most immediate and effective way of boosting manufacturing export growth. This conclusion puts into perspective the most common recommendation to expand Brazilian exports: to increase the number of small and medium firms engaged in exporting. Despite the unquestionable merits of such a proposal, its short-term impacts, given the current structure of Brazil's exports, tends to be limited. In particular, we showed that (i) despite the substantial rise in the number of exporters during the nineties, export growth was disappointing; and (ii) that it would likely take a massive increase in the number of exporters to produce the same expansion in aggregate exports, that could be obtained with a relatively modest increase in the export propensity of large firms, particularly of those national owned. This last point takes us to another important conclusion, which also goes against the established view: if there is a group of firms that should and could be more outward-oriented, and therefore should be the focus of the complementary policies, this is the group of the national firms. The paper shows not only that the foreign firms' probability of exporting is higher, but also that they tend to have a larger export value.

Another complementary policy suggested by the results is to encourage firms that already export to be present in a larger number of regional markets. In particular, our results suggest that many exporters sell only in the Latin American market, and in this case the export volumes are on average lower than those observed for firm sales in other regional markets. Here it is also worth noting that the multivariate analysis did not support Fajnzylber's and Newfarmers concerns about a possible destination bias in foreign firms' exports. These firms, with a few exceptions in terms of size, have a higher probability than national firms to export to all markets. The Latin American bias, after controlling for size, sector and other attributes, is as important to national firms as it is to their foreign counterparts.

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Annex

Table A.1
Basic Descriptive Statistics of Variables Used in Regression Analysis⁽¹⁾

<i>Variable</i>	<i>Median</i>	<i>Q3-Q1</i>	<i>1st Decile</i>	<i>9th Decile</i>
REV (R\$ thousand)	1401	5398	99	20685
ASSREV	0.658	0.788	0.235	2.605
WAGE	5.31	3.23	2.83	9.36
SKILL	0.238	0.154	0.128	0.441
CC4	0.411	0.272	0.179	0.742
ICU	100.0	2.5	96.0	102.5
FW	0.310	0.144	0.227	0.423
FR	0.036	0.053	0.011	0.161

Notes: (1) See text for description of variables.

Table A.2
Probit Model for Probability of Firm Being an Exporter to the USA and Canada⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCPT	-10.4525	0.3480	-6.4929	0.4237	-6.3160	0.3705
LREV	0.3453	0.0055	0.3864	0.0061	0.3833	0.0060
ASSREV	0.0000	0.0000	0.0000	0.0000		
OWN	1.9008	0.2410	2.3898	0.2471	2.3580	0.2462
OREV	-0.0819	0.0144	-0.1147	0.0148	-0.1125	0.0147
SKILL	-2.1824	0.0836	-1.2524	0.1318	-1.1909	0.1262
CC4	0.2295	0.0420	0.0437	0.0498		
ICU	0.0429	0.0032	-0.0105	0.0037	-0.0107	0.0037
FW	0.2942	0.1144	0.2488	0.5861		
FR	-1.4530	0.1114	-0.1271	0.3320		
D1996	-0.0017	0.0206	-0.0754	0.0218	-0.0754	0.0217
D1997	-0.1431	0.0213	-0.0730	0.0227	-0.0728	0.0226
D16			1.0561	0.1492	0.9967	0.1452
D17			0.3446	0.0921	0.2959	0.0416
D18			0.1416	0.1240		
D19			1.4027	0.0728	1.3744	0.0393
D20			1.3089	0.0744	1.2865	0.0412
D21			-0.2846	0.1095	-0.2894	0.0758
D22			-0.5062	0.1247	-0.5197	0.0963
D23			-0.7556	0.1826	-0.8335	0.1356
D24			0.3830	0.0792	0.3420	0.0459
D25			0.1420	0.1051		
D26			0.5475	0.0848	0.5180	0.0446
D27			0.8496	0.0954	0.8028	0.0434
D28			0.3538	0.0881	0.3467	0.0414
D29			0.6608	0.0821	0.6281	0.0387
D30			0.7829	0.1485	0.7104	0.1033
D31			0.5060	0.0906	0.4790	0.0559
D32			0.6027	0.1333	0.5523	0.0761
D33			0.9771	0.1337	0.9135	0.0753
D34			0.5420	0.0876	0.5220	0.0528
D35			0.5415	0.1140	0.5337	0.0883
D36			0.7201	0.0763	0.6963	0.0438
% Corr. Pred. Resp.	84.0%		87.1%		87.1%	
Pseudo R ² (LRI)	0.222		0.282		0.282	
Number Observ.	63053		63053		63361	

Note: (1) In all cases, the LR and score tests for the null hypothesis that the slopes are jointly equal to 0 have p-values of less than 0.01%.

Table A.3
OLS Regression for Value of Exports to the USA and Canada ⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCEP	1.8989	0.9196	4.9164	1.0545	5.5121	0.8631
LREV	0.7359	0.0165	0.7432	0.0167	0.7413	0.0164
ASSREV	0.0026	0.0017	0.0028	0.0016	0.0027	0.0016
OWN	-2.0684	0.6102	-1.5495	0.5999	-1.4037	0.5936
OREV	0.1142	0.0355	0.0924	0.0349	0.0856	0.0345
SKILL	-2.9242	0.2339	-1.2750	0.3583	-0.8899	0.2637
CC4	0.5420	0.1190	0.5162	0.1285	0.5299	0.1161
ICU	-0.0052	0.0085	-0.0485	0.0089	-0.0499	0.0082
FW	0.8693	0.3777	0.9875	1.4978		
FR	1.5243	0.3532	3.7525	1.0233	2.7521	0.3589
D1996	-0.0772	0.0574	-0.1364	0.0554	-0.1195	0.0519
D1997	-0.1287	0.0601	-0.0355	0.0584		
D16			-0.1099	0.2719		
D17			0.1424	0.2637		
D18			0.3535	0.3416		
D19			1.5567	0.2059	1.4673	0.0879
D20			0.8072	0.1954	0.8243	0.0941
D21			0.5396	0.3202	0.4031	0.2202
D22			-0.8377	0.4100	-1.0250	0.3322
D23			0.4302	0.5643		
D24			0.3741	0.2401		
D25			-0.2423	0.3055		
D26			0.4780	0.2505	0.2868	0.1168
D27			1.4276	0.2657	1.1794	0.0957
D28			0.1354	0.2543	0.0201	0.1070
D29			0.3866	0.2498		
D30			0.4612	0.4166		
D31			0.1277	0.2672		
D32			0.5154	0.3742		
D33			-0.0004	0.3703		
D34			0.4116	0.2537		
D35			0.5068	0.3134		
D36			0.6348	0.2134	0.5898	0.1138
Adj R ²	0.3779		0.4264		0.4226	
Number Obs.	4958		4958		4958	

Note: (1) In all regressions dependent variable is *ln* of exports to the USA and Canada.

Table A.4
Probit Model for Probability of Firm Being an Exporter to Industrialized Countries other than USA and Canada⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCPT	-12.4599	0.3289	-9.2239	0.4038	-9.2587	0.3539
LREV	0.3490	0.0051	0.3823	0.0056	0.3825	0.0055
ASSREV	0.0000	0.0000	0.0000	0.0000		
OWN	2.1345	0.2263	2.6757	0.2297	2.6750	0.2295
OREV	-0.0876	0.0137	-0.1241	0.0139	-0.1239	0.0138
SKILL	-1.5962	0.0756	-0.6695	0.1164	-0.7083	0.1039
CC4	0.3032	0.0395	0.1971	0.0461	0.1885	0.0449
ICU	0.0590	0.0031	0.0174	0.0035	0.0180	0.0034
FW	0.9318	0.1098	0.0109	0.5726		
FR	-0.0518	0.0961	0.9441	0.2999	0.9223	0.1304
D1996	0.0107	0.0192	-0.0484	0.0201	-0.0484	0.0201
D1997	-0.1972	0.0199	-0.1591	0.0209	-0.1596	0.0209
D16			1.0132	0.1427	1.0092	0.1421
D17			0.3065	0.0856	0.3010	0.0428
D18			0.2650	0.1152	0.2600	0.0543
D19			1.3174	0.0651	1.3086	0.0426
D20			1.3799	0.0682	1.3736	0.0403
D21			-0.0375	0.0942		
D22			-0.0292	0.0965		
D23			-0.4158	0.1563	-0.4277	0.1051
D24			0.4278	0.0699	0.4319	0.0385
D25			0.0385	0.0988		
D26			0.5183	0.0765	0.5115	0.0479
D27			0.4993	0.0894	0.4944	0.0473
D28			0.2444	0.0793	0.2390	0.0445
D29			0.5336	0.0730	0.5327	0.0389
D30			-0.0479	0.1579		
D31			0.3351	0.0824	0.3357	0.0562
D32			0.4300	0.1237	0.4348	0.0688
D33			0.7320	0.1265	0.7338	0.0727
D34			0.6749	0.0773	0.6733	0.0512
D35			0.3477	0.1075	0.3464	0.0918
D36			0.7086	0.0687	0.7001	0.0429
% Corr. Pred. Resp.	83.8%		86.5%		86.6%	
Pseudo R ² (LRI)	0.233		0.282		0.283	
Number Observ.	63053		63053		63352	

Note: (1) In all cases, the LR and score tests for the null hypothesis that the slopes are jointly equal to 0 have p-values of less than 0.01%.

Table A.5
OLS Regression for Value of Exports to Industrial Countries other than the USA and Canada ⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCEP	-7.0022	0.7983	-4.7321	0.9273	-3.9792	0.7685
LREV	0.6875	0.0144	0.7058	0.0147	0.7199	0.0127
ASSREV	0.0021	0.0019	0.0021	0.0018		
OWN	-1.3313	0.5090	-0.6648	0.5045	0.1937	0.0543
OREV	0.0832	0.0298	0.0505	0.0295		
SKILL	-1.3993	0.1962	0.0591	0.3085		
CC4	0.1903	0.1051	0.1778	0.1133		
ICU	0.0857	0.0072	0.0374	0.0078	0.0360	0.0075
FW	0.8480	0.3418	1.9672	1.3303		
FR	5.0806	0.2757	9.4616	0.7850	8.7161	0.5020
D1996	0.0830	0.0505	0.0242	0.0489		
D1997	-0.3028	0.0536	-0.2060	0.0521	-0.2121	0.0484
D16			1.1387	0.2362	1.1880	0.2310
D17			1.2772	0.2174	1.0578	0.1426
D18			0.7102	0.2991	0.9538	0.1890
D19			1.8829	0.1718	1.8439	0.1320
D20			1.5984	0.1700	1.7151	0.1101
D21			1.3490	0.2505	1.4643	0.1979
D22			-0.1068	0.2772		
D23			2.0158	0.4105	1.5915	0.3166
D24			1.3398	0.1893	1.2631	0.1349
D25			0.6076	0.2565	0.3104	0.1626
D26			1.4473	0.2028	1.3352	0.1573
D27			2.0494	0.2193	1.8460	0.1464
D28			0.7970	0.2123	0.8858	0.1581
D29			1.0568	0.1972	0.9670	0.1487
D30			1.3071	0.4242	1.0469	0.3563
D31			0.6703	0.2183	0.6030	0.1778
D32			1.5335	0.3080	1.2630	0.1960
D33			1.4340	0.3120	1.1287	0.2051
D34			0.9550	0.2006	0.9422	0.1601
D35			1.2817	0.2749	1.3267	0.2454
D36			1.6569	0.1798	1.7397	0.1343
Adj R ²	0.3903		0.4345		0.4344	
Number Obs.	6275		6275		6279	

Note: (1) In all regressions dependent variable is \ln of exports to industrialized countries other than the USA and Canada.

Table A.6
Probit Model for Probability of Firm Being an Exporter to Latin America⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCPT	-10.3577	0.2948	-8.3478	0.3809	-8.3738	0.3631
LREV	0.4524	0.0048	0.4844	0.0052	0.4833	0.0052
ASSREV	0.0000	0.0000	0.0000	0.0000		
OWN	1.4896	0.2513	1.6034	0.2587	1.5893	0.2587
OREV	-0.0498	0.0155	-0.0637	0.0160	-0.0628	0.0160
SKILL	-1.2171	0.0639	-0.7192	0.1080	-0.7119	0.1078
CC4	0.3416	0.0353	0.3425	0.0415	0.3411	0.0414
ICU	0.0317	0.0028	-0.0092	0.0034	-0.0099	0.0033
FW	-0.1974	0.0921	1.6586	0.5242	2.0303	0.3489
FR	-3.8912	0.1050	-0.8515	0.2927	-0.8393	0.2914
D1996	0.0108	0.0173	-0.0493	0.0180	-0.0451	0.0167
D1997	-0.0556	0.0174	-0.0125	0.0182		
D16			1.0334	0.1559	1.0360	0.1553
D17			0.8320	0.0789	0.8456	0.0779
D18			0.0957	0.1055		
D19			1.0534	0.0641	1.0262	0.0542
D20			0.9382	0.0665	0.8972	0.0425
D21			0.4066	0.0809	0.3525	0.0522
D22			-0.7087	0.0943	-0.7669	0.0710
D23			-0.6764	0.1546	-0.6305	0.1478
D24			0.7266	0.0663	0.7117	0.0638
D25			0.9196	0.0893	0.9341	0.0878
D26			0.6092	0.0730	0.5979	0.0708
D27			0.8354	0.0840	0.8487	0.0829
D28			0.6635	0.0735	0.6132	0.0457
D29			1.2418	0.0693	1.2227	0.0646
D30			0.3170	0.1348	0.3398	0.1326
D31			1.0041	0.0747	0.9862	0.0713
D32			0.6807	0.1162	0.7105	0.1131
D33			1.2310	0.1171	1.2555	0.1142
D34			1.0552	0.0736	1.0251	0.0648
D35			0.4184	0.0983	0.3854	0.0913
D36			0.7140	0.0655	0.6723	0.0450
% Corr. Pred. Resp.	86.5%		88.1%		88.2%	
Pseudo R ² (LRI)	0.307		0.343		0.343	
Number Observ.	63053		63053		63352	

Note: (1) In all cases, the LR and score tests for the null hypothesis that the slopes are jointly equal to 0 have p-values of less than 0.01%.

Table A.7
OLS Regression for Value of Exports to Latin American Countries ⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCEP	-1.9265	0.5764	-2.5934	0.6897	-2.3325	0.1697
LREV	0.8073	0.0094	0.8245	0.0095	0.8238	0.0094
ASSREV	0.0044	0.0011	0.0046	0.0011	0.0046	0.0011
OWN	-2.1381	0.3398	-1.9445	0.3379	-1.9161	0.3373
OREV	0.1511	0.0200	0.1366	0.0199	0.1346	0.0199
SKILL	-0.4587	0.1255	-0.2295	0.1964		
CC4	0.9448	0.0618	1.0060	0.0688	0.9810	0.0660
ICU	0.0071	0.0054	-0.0011	0.0062		
FW	0.6927	0.1901	0.9316	0.8835		
FR	-0.5872	0.2150	3.0419	0.5861	2.5407	0.3056
D1996	-0.0028	0.0316	-0.0118	0.0315		
D1997	0.0649	0.0316	0.0780	0.0315	0.0816	0.0261
D16			0.3849	0.2068	0.4112	0.2055
D17			0.7882	0.1446	0.6432	0.0720
D18			0.4598	0.1966	0.5426	0.1015
D19			0.7944	0.1229	0.7653	0.0757
D20			1.0705	0.1247	1.1164	0.0781
D21			0.9260	0.1509	0.9180	0.0914
D22			0.0035	0.1974		
D23			0.5534	0.3325		
D24			0.8331	0.1279	0.6893	0.0685
D25			0.9401	0.1635	0.7604	0.0770
D26			0.9836	0.1411	0.8879	0.0860
D27			0.8147	0.1532	0.6542	0.0786
D28			0.9126	0.1427	0.9008	0.0761
D29			1.2732	0.1353	1.1517	0.0730
D30			0.6975	0.2537	0.4158	0.1832
D31			1.0094	0.1416	0.8888	0.0852
D32			0.2890	0.2093		
D33			1.1062	0.2084	0.8545	0.1127
D34			1.1667	0.1372	1.0792	0.0833
D35			0.4410	0.1792	0.3661	0.1411
D36			0.5319	0.1249	0.5394	0.0783
Adj R ²	0.5366		0.5503		0.5504	
Number Obs.	11531		11531		11531	

Note: (1) In all regressions dependent variable is *ln* of exports to Latin American countries.

Table A.8
Probit Model for Probability of Firm Being an Exporter to Developing Countries Outside Latin America⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCPT	-13.8446	0.3820	-12.0264	0.4717	-12.0163	0.4447
LREV	0.4228	0.0064	0.4594	0.0070	0.4587	0.0070
ASSREV	0.0000	0.0000	0.0000	0.0000		
OWN	1.5682	0.2808	1.8397	0.2903	1.8103	0.2899
OREV	-0.0698	0.0166	-0.0917	0.0171	-0.0899	0.0171
SKILL	-1.9189	0.0894	-1.6074	0.1367	-1.5716	0.1338
CC4	0.1569	0.0459	0.0649	0.0531		
ICU	0.0608	0.0035	0.0196	0.0041	0.0206	0.0039
FW	0.6931	0.1286	3.8618	0.6136	3.6684	0.5284
FR	0.0305	0.1089	2.3547	0.3355	2.2077	0.2989
D1996	0.0272	0.0225	-0.0319	0.0236		
D1997	-0.1733	0.0232	-0.1387	0.0245	-0.1267	0.0225
D16			1.0900	0.1521	1.1165	0.1496
D17			0.5115	0.0982	0.4747	0.0917
D18			-0.8480	0.1415	-0.8503	0.1036
D19			1.0984	0.0748	1.0676	0.0498
D20			0.8836	0.0760	0.8801	0.0484
D21			-0.0010	0.1008		
D22			-0.7806	0.1423	-0.7912	0.1205
D23			0.6295	0.1566	0.5582	0.1503
D24			0.7493	0.0802	0.7185	0.0640
D25			0.4434	0.1119	0.3827	0.1032
D26			0.6930	0.0877	0.6616	0.0727
D27			0.8743	0.0990	0.8380	0.0915
D28			0.0169	0.0900		
D29			0.9061	0.0834	0.8723	0.0615
D30			0.9493	0.1745	0.8879	0.1690
D31			0.6941	0.0938	0.6682	0.0769
D32			0.9323	0.1447	0.8956	0.1384
D33			1.6153	0.1412	1.5596	0.1348
D34			0.6947	0.0884	0.6697	0.0647
D35			0.1056	0.1382		
D36			0.3898	0.0782	0.3700	0.0489
% Corr. Pred. Resp.	87.1%		89.5%		89.4%	
Pseudo R ² (LRI)	0.279		0.325		0.325	
Number Observ.	63053		63053		63361	

Note: (1) In all cases, the LR and score tests for the null hypothesis that the slopes are jointly equal to 0 have p-values of less than 0.01%.

Table A.9
OLS Regression for Value of Exports to Developing Countries Outside Latin America ⁽¹⁾

Variable	A		B		C	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
INTERCEP	-6.3495	0.8715	-5.4611	1.0046	-3.8418	0.8543
LREV	0.8094	0.0167	0.7914	0.0175	0.7954	0.0173
ASSREV	0.0145	0.0041	0.0125	0.0040	0.0121	0.0040
OWN	-1.6560	0.6254	-2.1129	0.6216	-2.0600	0.6185
OREV	0.0811	0.0357	0.1133	0.0355	0.1104	0.0353
SKILL	-0.4342	0.2233	0.5693	0.3310		
CC4	-0.2733	0.1132	-0.3380	0.1215	-0.3700	0.1110
ICU	0.0574	0.0078	0.0522	0.0085	0.0441	0.0080
FW	-0.5312	0.3958	2.0867	1.3093		
FR	4.2527	0.2855	0.8979	0.8508		
D1996	0.1037	0.0555	0.0791	0.0538		
D1997	-0.1498	0.0581	-0.1613	0.0566	-0.1756	0.0517
D16			0.6259	0.2396	0.6684	0.2337
D17			-0.9482	0.2460	-1.0974	0.1243
D18			-2.0415	0.3761	-1.7055	0.2772
D19			-0.7340	0.1866	-0.6719	0.0932
D20			-0.4592	0.1735	-0.2840	0.0985
D21			-0.9457	0.2484	-0.6880	0.1476
D22			-1.7027	0.4399	-1.4118	0.3873
D23			1.0299	0.3655	0.6174	0.2087
D24			-0.9807	0.2128	-0.8677	0.0859
D25			-1.8821	0.2816	-2.0712	0.1414
D26			-0.9501	0.2242	-0.9974	0.1134
D27			-0.1665	0.2411		
D28			-1.7434	0.2286	-1.5341	0.1175
D29			-1.2092	0.2200	-1.1428	0.0878
D30			-0.9434	0.4428	-0.9184	0.3526
D31			-1.7543	0.2416	-1.6964	0.1375
D32			-1.3182	0.3551	-1.4082	0.2086
D33			-1.2118	0.3351	-1.3691	0.1748
D34			-1.5195	0.2238	-1.4205	0.1126
D35			-1.3179	0.3610	-1.1949	0.3064
D36			-1.4578	0.1893	-1.2682	0.1178
Adj R ²	0.4838		0.5199		0.5184	
Number Obs.	4291		4291		4291	

Note: (1) In all regressions dependent variable is *ln* of exports to developing countries outside Latin America.

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