

TEXTO PARA DISCUSSÃO N° 1275a

COMPARATIVE ADVANTAGE OR ECONOMIC POLICY? STYLIZED FACTS AND REFLECTIONS ON BRAZIL'S INSERTION IN THE WORLD ECONOMY—1994-2005

**Armando Castelar Pinheiro
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** Senior Researcher at Ipea and professor of Economics at UFRJ, Rio de Janeiro, Brazil.

*** Research associate at Ipea and Partner, ECOSTRAT Consultores, Rio de Janeiro, Brazil.

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TEXTO PARA DISCUSSÃO

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SINOPSE

O trabalho em epígrafe analisa a performance exportadora brasileira, com foco em uma discussão dos papéis desempenhados pela diversificação das exportações, pelos ganhos de produtividade, pela política econômica e pela dotação de recursos naturais. Isso é feito em várias etapas, começando por uma avaliação comparada dos padrões de crescimento das exportações. Em seguida, analisamos as mudanças na competitividade das exportações conforme reveladas pelo desempenho exportador em relação ao resto do mundo, de acordo com duas abordagens: a primeira é uma análise do tipo Constant-Market-Share (CMS); a segunda, uma extensão da metodologia desenvolvida por Hummels e Klenow. O trabalho se encerra com uma análise das exportações agrícolas na qual discutimos os papéis da política econômica, especialmente dos instrumentos de promoção e das instituições voltadas para o comércio exterior. Entre as conclusões, destacamos a existência de fatores comuns ao atual *boom* exportador e a expansões anteriores, no sentido de que: *a)* durante o *boom* atual o Brasil tem reforçado sua postura de *global trader*, mas com as exportações adicionais concentrando-se em mercados não tradicionais como China, Rússia, África e países da América do Sul fora do Mercosul e da América Central; *b)* a participação relativa das manufaturas na cesta exportadora não variou muito, apesar do excelente desempenho das exportações do *agribusiness* desde o começo dos anos 1990; e *c)* tanto as exportações industriais quanto as agrícolas experimentaram uma crescente diversificação. No entanto, as inovações, definidas como a introdução de novos produtos na pauta, foram relativamente pouco importantes, exceto em mercados específicos.

ABSTRACT

This paper analyzes export performance in Brazil, discussing the roles played by export diversification, productivity enhancements, policy, and natural resource endowments. First, we provide a brief account of Brazil's recent export performance and analyze changes in the competitiveness of Brazilian exports in a long-term perspective. This is done by evaluating actual sector export patterns vis-à-vis the rest of the world in an attempt to grasp a broad picture of comparative export behavior. We proceed to evaluate changes in exports competitiveness as described by shifts in the country's revealed export behavior compared to the rest of the world, for which we rely on a traditional Constant-Market-Share (CMS) decomposition and on an extension of Hummels and Klenow's approach. Next, we analyze agricultural exports, a discussion followed by an evaluation of the role of trade policy, and in particular export promotion instruments and institutions. Among the conclusions we highlight that there are several commonalities between the present and previous export booms, in the sense that: *a)* it reinforced the country's diversified trade relations, with additional exports concentrated in non-traditional markets such as China, Russia, Africa, and South and Central American, non-Mercosur member countries; *b)* it did not change the relative share of manufactures in Brazil's export basket, despite the excellent performance of agro-based exports since the early 1990s; and *c)* both agricultural and manufacture exports have experienced an increasing product diversification. Yet, innovations, defined as new goods entering the export basket, were relatively unimportant, except for some specific markets.

SUMMARY

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1 INTRODUCTION

Brazil experienced an export boom in the 5 years of this decade, to the extent that export expansion accounted for four-fifths of Gross Domestic Product (GDP) growth in 2001-2005. This increased export orientation was relatively widespread among Brazilian firms, with the Instituto Brasileiro de Geografia e Estatística (IBGE) 2004 Industrial Survey showing that the share of exports on the revenues of industrial firms doubled from 10.8% in 1996 to 20.4% in 2004 (see also RIBEIRO; MARKWALD, 2002; NASSIF; PUGA, 2004). As a result, Brazil became a more important global player, with its share in world exports going from a low 0.8% in 1999 to 1.1% 6 years later. This recent export boom shared a number of common features with previous similar cycles. First, it reinforced the country's diversified trade relations, with export growth concentrated in non-traditional markets such as China, Russia, Africa, and South and Central American, non-Mercosur member countries. Second, it did not change the relative share of manufactures in Brazil's export basket, despite the excellent performance of agricultural exports since the early 1990s. Third, both agricultural and manufacture exports have experienced an increasing product diversification. Yet, innovations, defined as new goods entering the export basket, were relatively unimportant, except for some specific markets.

Brazil has traditionally been more export oriented and had a more diversified export basket than most other Latin American countries, partly as a result of being a larger economy, but also on account of economic policy. In particular, as shown in table 1, the share of manufactures in Brazil's exports was almost twice that of other South and Central American countries. To a large extent, this reflected the earlier concern with export growth, which was a major feature of the policy regime introduced in the late sixties, as a way to mitigate the anti-export bias of the import substitution regime, which led Brazil to be then ranked together with the Asian Tigers as an export-oriented economy. Writing in the late seventies about how trade strategies had become less inward-oriented in LDCs, Krueger (1978, p. 270) remarked in that regard: "In other countries, most notably Brazil and South Korea, bias has been completely reversed, to a point where one might claim a bias towards the foreign market and against the home market". Thus, the adoption of a competitive exchange rate and a host of export incentives helped to fuel an export boom marked by double-digit growth rates in foreign sales, notably of manufactures, which lasted until the early eighties.

TABLE 1
Distribution of exports by main categories—2004
(%)

	Agricultural products	Fuels and mining products	Manufactures
South and Central America	29.5	33.6	36.9
Brazil	32.7	13.8	53.5
Rest of South and Central America	27.8	44.2	28.1
World	9.1	14.8	76.1

Source: World Trade Organization (WTO) Statistics.

In the following years, export growth was both lower and more erratic, to some extent due to the reintroduction of high trade barriers and the decline in public savings, which limited the government's ability to subsidize exports. This bias against exports, and in particular agricultural exports, lasted until the mid-1990s, when trade

liberalization, greater openness to Foreign Direct Investment (FDI) and, in particular, the adoption of a more competitive exchange rate after 1999 gave another big push to exports. The strong performance of the world economy since 2002 has been another important factor. Other structural reforms, notably privatization, as well as targeted government interventions, also seem to have played an important role. Airplane exports boomed after the privatization of Empresa Brasileira de Aeronáutica S.A. (Embraer), the same happening with steel and cell phones a few years after the sale of the state-owned steel companies and Telecomunicações Brasileiras S.A. (Telebrás), respectively, to private investors. Foreign sales of automobiles rose after an increase in productivity, fostered by trade liberalization, and investment, in the aftermath of a renewed inflow of FDI. Public policy was also important; for instance, in the development of new seeds by Empresa Brasileira de Pesquisa Agropecuária (Embrapa), a state-owned company, the establishment of the special regime for the automobile sector, and the support given by Banco Nacional de Desenvolvimento Econômico e Social (BNDES) for the domestic production of telecom equipment.

Brazil has had relatively diversified exports since at least the mid-1990. Hummels and Klenow's (2005) estimated, for instance, that in 1995 Brazil had one of the largest extensive margins among Latin American countries, second only to Mexico, which enjoys a favored access to the United States market. As discussed below, most of the diversification of exports took place in the seventies and eighties, reflecting the rise in manufacture exports. Policies targeted at fostering the expansion of domestic output capacity in specific sectors—such as paper and pulp, nonferrous metals, petrochemicals, oil and capital goods—were also important. Of late, the evidence suggests that diversification was more important in regional terms and within sectors than across sectors, as in the seventies and eighties.

This paper discusses export performance in Brazil, discussing the roles played by export diversification, productivity enhancements, policy, and natural resource endowments. It is structured in six sections. Next, we provide a brief account of Brazil's recent export performance and analyze changes in the competitiveness of Brazilian exports in a long-term perspective. This is done by evaluating actual sector export patterns vis-à-vis the rest of the world in an attempt to grasp an initial picture of comparative export behavior. Section 3 evaluates changes in exports competitiveness as described by shifts in the country's revealed export behavior compared to the rest of the world, for which we rely on a traditional Constant-Market-Share (CMS) decomposition and on an extension of Hummels and Klenow's approach. Section 4 analyzes agricultural exports. Section 5 discusses the role of trade policy, and in particular export promotion instruments and institutions. Section 6 summarizes the paper's main conclusions and presents some possible lessons for the whole of Latin America.

2 THE CHANGING STRUCTURE OF BRAZIL'S EXPORTS SINCE THE MID-1960s

2.1 GENERAL TRENDS

Brazilian exports have displayed major changes and diversification since the mid-1960s. Sector and product diversification have been particularly strong until the mid-1990s.

However, in many sub-periods since the 1960s exports have grown less than the world average. This is shown in the next two tables, in the construction of which we took into account major economic policy changes as the dividing lines of selected periods shown.

Brazilian exports have expanded significantly since the mid-1960s, outstripping the expansion in world trade: in current prices, they grew on average 1 percentage point (p.p.) more per year; in constant prices, 1.5 p.p. more. There has also been a substantial sector and product diversification, particularly until the mid-1990s. However, breaking this period down according to the main landmarks in economic policy and conditions, we find that this process has not been uniform across time, and during most of 1974-1999 Brazilian exports have grown below the world average.

Thus, as shown in table 2, Brazil's export performance excelled world average only in 1967-1973, 1979-1984, and 1999-2005. As a rule, periods in which the exchange rate was more competitive (as in 1979-1984, despite raising domestic inflation) resulted in faster than world average export growth.

TABLE 2
Brazil and world trade growth rates: selected periods
(%)

Periods	World	Brazil	Yearly averages			
			Current prices		Constant prices	
			World	Brazil	World	Brazil
1967-1973	160.2	274.8	17.3	24.6	10.6	13.0
1973-1979	193.1	145.9	19.6	16.2	4.9	4.1
1979-1984	19.5	77.2	3.6	12.1	0.5	12.7
1984-1989	59.5	27.3	9.8	4.9	6.9	3.0
1989-1995	66.5	35.3	8.9	5.2	6.5	3.8
1995-1999	15.0	3.2	3.6	0.8	7.6	6.0
1999-2005	81.3	146.4	10.4	16.2	6.9	12.2
1967-2005			10.9	11.9	6.3	7.8

Sources: International Monetary Funds (IMF)/International Financial Statistics (IFS), Ipeadata and IBGE.

Table 2 also shows that exports have resumed rapid and sustained growth since 2000, returning to double-digit expansion rates in recent years. This more intense export orientation of the Brazilian economy can be gauged by the fact that the expansion of exports of goods and services accounted for almost 80% of GDP growth in the first half of the present decade, despite the economy having remained still relatively closed: trade flows of goods represented 18.4% of GDP in 2000, increasing to 24.2% in 2005 (measured in current prices).

Reflecting this relative performance, the ratio of Brazilian exports to total world imports has fluctuated considerably since the mid-1960s, although staying most of the time grossly around the 1% mark. The most remarkable exception on the high side is the record 1.4% share of world trade in 1984, reached after a period of abnormally slow world trade growth; and in the downside the lows observed in 1967 and 1999, when Brazilian exports amounted to just 0.8% of world trade (table 3).

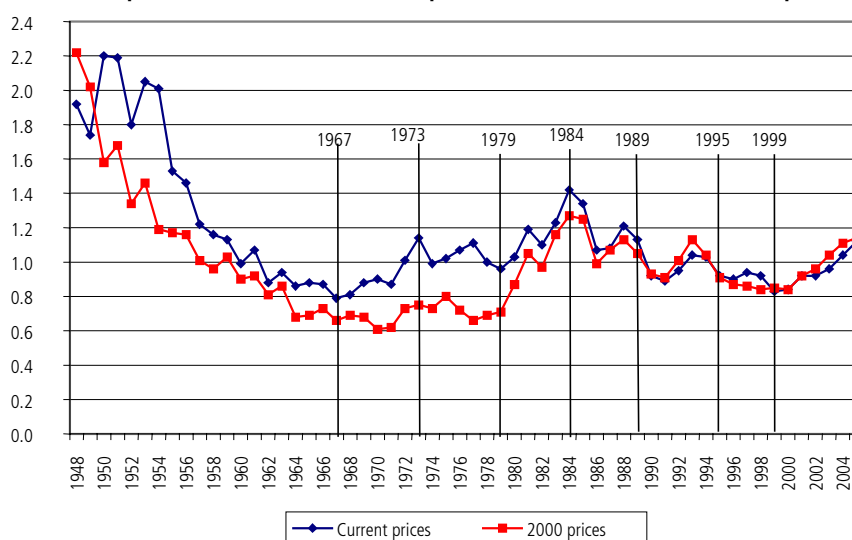
TABLE 3
Total world trade: selected years
 (US\$ million, current)

Years	World imports	Brazilian exports	Brazil/world (%)	
			Current prices	Constant 2000 prices
1967	208,591	1,654	0.79	0.66
1973	542,705	6,199	1.14	0.75
1979	1,590,410	15,244	0.96	0.71
1984	1,899,830	27,005	1.42	1.27
1989	3,029,470	34,383	1.13	1.05
1995	5,044,520	46,506	0.92	0.91
1999	5,803,150	48,011	0.83	0.85
2005	10,522,400	118,308	1.12	1.14

Sources: IMF/IFS, Ipeadata and IBGE.

Figure 1 shows that the low 1967 mark came after a prolonged decline in the ratio of Brazil's exports to world imports, reflecting the anti-export bias of the import substitution strategy adopted after World War II. This decline was even more substantial when measured in constant 2000 prices, with the ratio of Brazilian exports to world imports falling to a mere 0.66% in 1967, to recover somewhat in the following five years. Equally noteworthy is the significant rise in this constant-price ratio from 1979 to 1984, reflecting the substantial increase in Brazilian exports, despite the virtual stagnation in world trade and falling export (dollar) prices. Since the mid-1980s, Brazilian export prices have risen in tandem with world import prices, so there has been little divergence between the ratios of Brazil's exports to world imports measure in current and constant prices (figure 1). Thus, both measures show the falling participation of Brazil's exports in world trade from 1984 to 1999, and the significant recovery in the following years.

FIGURE 1
Brazilian exports as a % of total world imports in current and constant 2000 prices

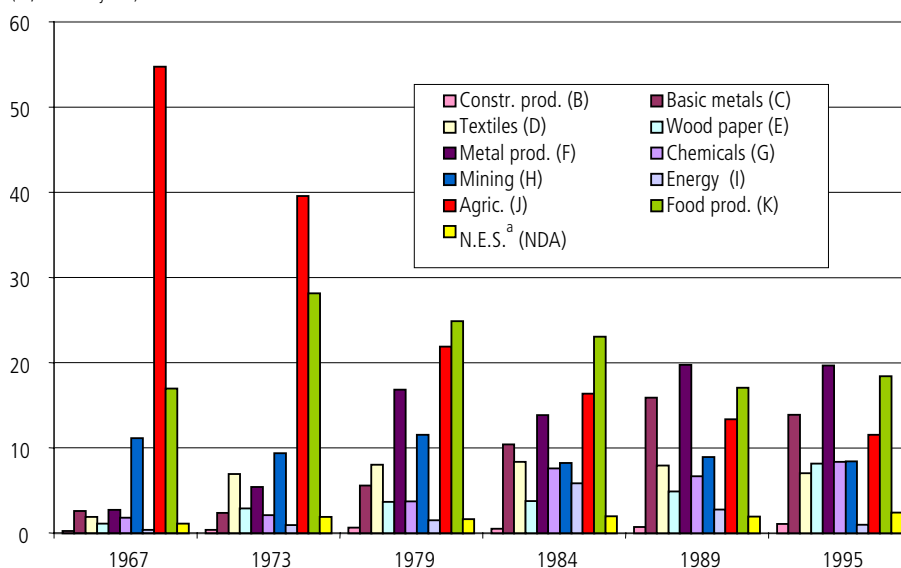


Sources: IMF/IFS, Ipeadata and IBGE.

2.2 SECTOR AND REGIONAL DIVERSIFICATION

The sector structure of Brazil's exports also changed substantially in this period, mimicking to some extent what happened to world trade. Figure 2 reveals that the share of agricultural products in total exports declined from 54.8% in 1967 to 11.6% in 1995, whereas that of metal products, wood and paper, and, to a lesser extent, chemicals rose from almost nil to 19.7%, 8.1% and 8.4%, respectively. The share of textiles in total exports increased until the mid-1980s, stabilizing afterwards, while that of mining hovered around 10% throughout, with no clearly discernible trend.¹ The share of food products, in turn, increased from 17% in 1967 to 28.2% in 1973, but subsequently shrank to 18.4% in 1995.

FIGURE 2
Brazil: sector composition of exports—1967-1995
(%, selected years)



Source: Comptes Harmonisés sur les Échanges et L'Économie Mondiale (Chelem) database, selected years.

^a Non elsewhere specified.

Table 4 shows the patterns of sector growth over time, measured as the difference between the average growth rates in sector and total world imports in each period. Lagging sectors in each period are marked in gray. It can be verified that the share of mining and agricultural products in world trade declined consistently, while those of construction materials, basic metals and food products fell in all periods, except for 1984-1989, which, as noted above, was marked by a low expansion in world trade. On the high-growth side, chemicals was the leading sector in all periods, followed by metal products—except in 1973-1979, when it grew only 9.2% less than the world average of 181%. Energy products represents a special case, especially from 1973 to 1984, because of rising fuel prices during the first and second oil shocks, which led to high nominal export values. Wood and paper, in turn, showed an above average performance in 1979-1995, while textiles did the same in 1984-1995.

1. But note that after 1995 the share of mining in total exports increased from 6.7% to 11.2%, according to the Brazilian sector classification. See table 6.

TABLE 4

Difference between the growth rates of sector and total world imports: selected sectors and periods

(Laggard sectors cells marked in gray)

r[i] - r	Construct.	Basic metals	Textiles	Wood and paper	Metal prod.	Chemicals	Mining	Energy	Agricultural	Food prod.	N.E.S. ^a
1967-1973	0.0242	-0.2926	0.2680	-0.1952	0.1816	0.1991	-0.5049	0.2107	-0.3434	-0.0598	-0.0042
1973-1979	-0.0404	-0.4969	-0.4303	-0.2657	-0.0923	0.1928	-0.5947	2.2083	-0.7896	-0.5585	0.6995
1979-1984	-0.1222	-0.1985	-0.0215	0.0476	0.0995	0.0192	-0.0939	0.0356	-0.1499	-0.1102	-0.0772
1984-1989	0.2703	0.1697	0.3822	0.4374	0.3063	0.1892	-0.1883	-0.8015	-0.2785	0.0778	0.2556
1989-1995	-0.0360	-0.2061	0.0598	0.0496	0.1568	0.0677	-0.4806	-0.3945	-0.4123	-0.0913	0.5079

Source: Chelem database, selected years.

^a Non elsewhere specified.

Computing an index of structural change of sector exports² and comparing its values over periods one finds that, at this level of aggregation, the sector composition for Brazil's exports changed more pronouncedly in 1973-1979, coming the 1967-1973 period in a close second. In both the 1979-1984 and 1984-1989 periods structural change was less intense than in 1967-1979, decelerating to almost no change in 1989-1995, the period with the smallest value for this index. This is broadly consistent with the idea that the diversification of Brazilian exports was more intense in the initial years of the post mid-1960s period than in the more recent sub-periods.

TABLE 5

Structural change index of Brazil's exports: selected periods

Periods	Structural change index	Rank
1967-1973	0.0395	2 nd
1973-1979	0.0474	1 st
1979-1984	0.0111	4 th
1984-1989	0.0122	3 rd
1989-1995	0.0027	5 th

Source: Chelem database, several years.

The above indicates that Brazilian exports went from being almost exclusively based on agricultural, mining and food products to becoming relatively well distributed among the 11 different sectors in the above classification, except for construction products and energy. Diversification was, thus, the norm. Obviously, the extent to which the expansion in exports coincided with, and was likely made possible by, its diversification tends to become more discernible as we work with finer product classifications. A step in that direction is taken in tables 6 and 7, which presents shares and growth rates of sector of exports for a 32-sector classification in 1975-2005. Thus, already in 1975, a few commodity-producing sectors concentrated

2. The index is obtained by the sum over all sectors of the squared values of the difference of each sector share in successive periods.

a large share of total exports: agriculture and livestock, mineral extraction, sugar and coffee. These were still large export sectors in 2005, but their share in total exports had declined substantially by then; indeed, in 2005 the leading export sector was “auto parts and other vehicles” (not counting automobiles, which also recorded large exports).

TABLE 6
Sector composition of exports
(%)

Sectors	1975	1995	2005	
1	Agriculture and livestock	14.9	2.9	5.5
2	Mineral extraction	12.1	6.6	7.7
3	Oil and coal	1.1	0.1	3.5
4	Non-metallic minerals	0.5	1.0	0.9
5	Steel	1.9	8.9	7.4
6	Non-ferrous metals	0.4	4.9	2.9
7	Other metallurgical	0.6	1.7	1.3
8	Machinery, equipment and tractors	2.2	5.1	5.5
9	Electrical	1.5	3.1	2.4
10	Electronic equipment and products	1.8	1.5	3.1
11	Automobiles	2.6	2.5	5.8
12	Auto parts and other vehicles	2.5	6.9	9.0
13	Wood and furniture products	1.8	3.0	3.4
14	Pulp, paper and printing	0.9	5.9	2.9
15	Rubber products	0.2	1.2	0.9
16	Chemicals (basic)	0.6	1.8	2.3
17	Oil refining and petrochemicals	1.6	3.9	5.3
18	Chemicals, miscellaneous	1.0	1.5	1.1
19	Pharmaceuticals and perfumes	0.2	0.6	0.7
20	Plastics	0.1	0.2	0.2
21	Textiles	4.8	2.6	1.6
22	Clothing	1.0	0.3	0.2
23	Footwear and leather products	2.7	4.5	3.0
24	Coffee	11.5	5.4	2.5
25	Vegetable products, industrialized	3.5	5.3	2.8
26	Animal production (abate)	1.9	2.9	6.8
27	Dairy products	0.0	0.0	0.1
28	Sugar	13.2	4.1	3.3
29	Vegetable oils	8.6	6.9	3.6
30	Other food products	1.5	1.3	1.2
31	Miscellaneous industries	0.9	1.8	1.1
32	Non classified	1.9	1.4	1.8

Source: Table A.1, appendix A.

TABLE 7
Sector export growth
(FOB, US\$ million)

Sectors	Average annual growth rates (%)			Ratio between 2005 and 1975 values	Rank	
	1985/1975	1995/1985	2005/1995		2005/1975	2005/1995
Agriculture and livestock	3.4	-2.7	37.3	5	27	6
Mineral extraction	12.6	10.1	24.4	9	25	10
Oil and coal	-60.2	137.2	137.7	45	11	1
Non-metallic minerals	31.1	25.6	17.0	26	16	15
Steel	66.2	14.9	16.3	54	3	16
Non-ferrous metals	70.5	33.4	8.0	90	2	26
Other metallurgical	41.9	20.6	15.6	30	14	18
Machinery, equipment and tractors	32.3	25.5	22.4	35	12	13
Electrical	21.1	32.7	14.8	21	18	20
Electronic equipment and products	29.4	4.9	38.8	24	17	5
Automobiles	32.7	5.2	42.3	31	13	4
Auto parts and other vehicles	44.2	18.8	27.3	49	6	8
Wood and furniture products	16.8	33.4	23.6	27	15	12
Pulp, paper and printing	49.1	37.2	4.9	45	9	29
Rubber products	61.8	20.2	13.5	52	4	21
Chemicals (basic)	45.1	20.3	26.1	52	5	9
Oil refining and petrochemicals	78.0	-6.4	28.3	45	10	7
Chemicals, miscellaneous	17.7	29.0	13.0	15	22	22
Pharmaceuticals and perfumes	38.6	27.0	23.9	49	7	11
Plastics	71.0	-6.9	15.8	21	19	17
Textiles	14.9	7.6	9.7	5	28	24
Clothing	8.7	3.5	2.3	2	31	31
Footwear and leather products	37.0	13.1	10.8	15	21	23
Coffee	23.3	-2.3	3.0	3	30	30
Vegetable products, industrialized	37.7	10.4	6.3	11	24	27
Animal production (<i>abate</i>)	39.0	9.7	42.7	49	8	3
Dairy products	123.8	-9.4	99.3	1,085	1	2
Sugar	-18.9	36.9	15.3	3	29	19
Vegetable oils	22.7	9.2	5.9	6	26	28
Other food products	21.3	12.7	18.4	11	23	14
Miscellaneous industries	42.5	13.0	8.7	16	20	25
Non classified	8.0	20.7	28.2	13		
Total	24.2	12.6	20.5	14		
Memo:						
Average change in \$ exports prices (%)	3.2	2.5	0.1			

Source: Table A.1, appendix A.

This highlights the fact that some sectors displayed much faster export growth than others, a fact that becomes clearer in table 7, which shows sector export growth in 1975-2005 and sub-periods within. Overall, exports increased by a factor of 13.65 in the three decades shown above: 2.96 between 1975 and 1985, 1.81 from 1985 to 1995 and 2.54 between 1995 and 2005. The ranks of fastest growing sector exports changed substantially with time, with good performance concentrated on sub-periods, rather than extending throughout the whole 1975-2005 period. Thus, considering the three decades as a whole, exports of dairy products were the fastest growing sector (factor of 1,085). But in 2005 these exports accounted for only 0.11% of total exports. The second fastest growing sector was non-ferrous metals. But the performance in the past decade was not as good as two previous ones. The third sector was Steel—but, again, the performance during 1995-2005 was not impressive either. In both cases the sector share of total exports decreased between 1995 and 2005.

Overall, the Spearman rank correlation coefficient for sector growth rates was equal to -0.18 comparing the first two sub-periods, -0.12 contrasting the last two, and -0.01 when correlating performance in 1975-1985 with that in 1995-2005.³ This suggests that there has been a continued process export diversification throughout these three decades, which strengthens the argument that in a large economy as Brazil's export expansion tends to rely more on the extending the basket of exports—the extensive margin, in Hummels and Klenow (2005) terminology—than on exporting more intensely in the same traditional sectors.

Sectors whose exports expanded more in 1975-2005 had in general lower export volumes in 1975, causing a certain degree of convergence in the shares of each sector in total exports. As a consequence, in 2005 no sector answered for more than 10% of total exports, and only a few had shares above 5% (table 6). Thus, in 2005, the ten leading sectors were (exports shares in parenthesis): *a*) auto parts and other vehicles (9.0%); *b*) mineral extraction (7.7%); *c*) steel (7.4%); *d*) animal production (*abate* meat, poultry and pork) (6.8%); *e*) automobiles (5.8%); *f*) machinery, equipment and tractors (5.5%); *g*) agriculture and livestock (5.5%); *h*) oil refining and petrochemicals (5.3%); *i*) vegetable oils (3.6%); and *j*) oil and coal (3.5%).

This sector diversification of exports can be assessed more objectively by looking at how the Hirschman-Herfindahl Index (HHI) for sector exports evolved during this period. As shown in figure 3, there was a substantial fall in the HHI throughout the 1975-1995 period, followed by a decade of a more constrained fluctuation. The rise in the exports HHI in 2004-2005 reveals, though, that the resurgence of “traditional” exports has also been an important factor behind the recent export boom.

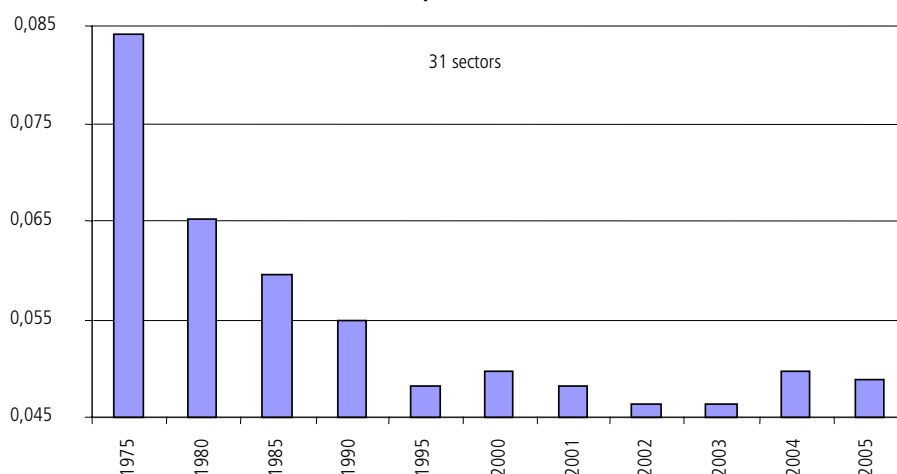
The analysis below identified two fast export growth periods: 1975-1985 and 1995-2005. As shown in table 7, in both periods Brazilian exports expanded at average annual rates of more than 20% in real terms, with several sectors recording even more remarkable growth rates. The first period was clearly one of substantial diversification, as suggested by figure 3, while the second was marked by less

3. The Pearson correlation coefficients were, respectively, -0.60 , 0.51 and -0.15 .

substantial changes in the cross-sector distribution of exports. Probing deeper into the more recent statistics, for which we have a ten-year consistent desegregation of exports into 199 activities, we see in figure 4 that there were not very substantial changes in the concentration of exports in this latter period. Thus, the HHI fell between 1997-1998 and 2003-2004, but the decline was not very large. This conclusion is ratified by the results of Rios and Iglesias (2005), which show that export innovations, defined as products exported in 2003-2004 but not in 1997-1998, were not a critical element behind Brazil's export boom in this period, except for a few non-traditional markets. Thus, the authors conclude that (p. 18, our translation):

In sum, innovations did not represent a significant alternative for Brazil's global export basket, nor for its more traditional markets, such as the United States, Japan and the European Union (EU). In the also traditional markets in the Americas, like Canada, Costa Rica, the Andean Countries and Mexico, innovations accounted for a larger share, but still below one fifth of the value of Brazilian exports to these countries. In the same situation are relatively new markets as China, Saudi Arabia and Iran. As a result, the only group in which innovations may have generated relevant changes in the commercial agenda is the first group highlighted here (in which are India, South Korea, Russia, South Africa and Thailand)—(in which) innovations represented a high share of the value and number of exported goods.

FIGURE 3
Hirschman-Herfindahl Index for sector exports—1975-2005



This last quote highlights an important feature of the more recent export boom period: the enhanced diversification of Brazil's export markets. Table 8 shows that from 1999 to 2005, the share of traditional export markets—the EU, the United States, Japan and Mercosur—declined considerably, for such a short period, falling from 71% to 54% of total exports. Thus, while in previous instances rapid export growth led to considerable sector diversification, notably in the 1970s and 1980s, this hallmark of this last round was regional diversification. As shown in table 2, in the appendix A, this was the result of a sum of independent moves, from greater food exports to China, Russia and Africa, to larger sales of fuels and machinery and transport equipment to South and Central American countries.

FIGURE 4
Hirschman-Herfindahl Index at the activity level–1996-2005

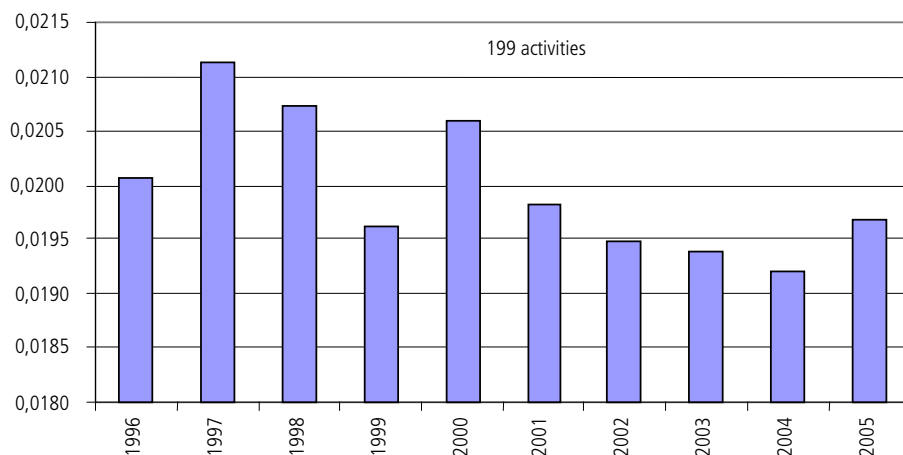


TABLE 8
Distribution of Brazilian exports by main destination markets
 (%)

	1999	2005
European Union (25)	29.3	22.4
United States	22.6	19.2
Japan	4.6	2.9
Mercosur	14.1	9.9
Aladi ex-Mercosur	7.9	11.0
China	1.4	5.8
Russia	1.6	2.5
Middle East	3.1	3.6
Africa	2.8	5.1
Asian Tigers	3.4	3.8
Others	9.3	13.8
Total	100.0	100.0

Source: Ministry of Development, Industry and Commerce.

2.3 COMPARATIVE ADVANTAGE

Changes in competitiveness caused by economic policy and comparative advantage shifts were at the root of the observed record. They were particularly important with respect to manufacturing sector exports during most of the period since the 1960s—which is not to say that agro-based exports have not benefited from changes in comparative advantage, in many cases made possible by agro research carried out by Embrapa, the state research firm. Even so, measures of competitive performance in Brazil, as in the rest of Latin America, show that the country lags behind the most dynamic regions in the developing world in the 1980s and 1990s: East and Southeast Asia. Differences in performance between the two groups of countries vary from

sector to sector within manufacturing. This can be shown by dividing manufactures into four groups of activities/products by technological content: Resource Based (RB), includes agro-based and mineral-based; Low Technology (LT), includes the fashion cluster and other low tech activities; Medium Tech (MT), includes the auto segment, engineering products and process products; and High Technology (HT), includes electronics and high-tech electrical products and other high-tech (see LALL; ALBALADEJO; MOREIRA, 2004, *passim*). It can be shown that the structure of manufacturing activity has generally moved down the technology scale: RB activities have done better than other activities while MT and HT, the drivers of sustained industrial growth, have displayed a below average performance. The picture for exports is brighter, though, as exports growth in all categories have improved from the 1980s to the 1990s, with HT exports growing faster than the other categories.

To what extent does Brazil fit this picture? Table 9 shows comparative data of exports on Brazil, Mexico and the rest of Latin America according to technology intensity to help answer this question. Mexico's performance after 1990 is markedly different from Brazil's and from the rest of Latin America, which is the reason for having singled out this country from the rest of Latin America.

TABLE 9
Brazil, Mexico and the rest of Latin America:^a manufactured exports–1980-1990-2000

	Export values (US\$ million)			Growth rates (%)			World market shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Brazil									
Resource based	5,425	8,204	13,322	4.7	5.0	4.8	1.6	1.5	1.5
Low tech	2,278	4,533	6,545	7.9	3.7	5.7	1.0	0.9	0.8
Medium tech	3,979	8,063	13,778	8.2	5.5	6.8	0.8	0.8	0.8
High tech	869	1,360	6,959	5.1	17.7	11.6	0.5	0.3	0.5
Total–Brazil	12,550	22,159	40,603	6.5	6.2	6.4	1.0	0.8	0.8
Latin America ex-Brazil and Mexico									
Resource based	12,268	14,237	33,555	1.7	10.0	5.4	3.7	2.6	3.7
Low tech	2,322	5,030	9,312	9.0	7.1	7.6	1.0	1.0	1.1
Medium tech	1,852	3,388	10,594	6.9	13.5	9.6	0.4	0.3	0.6
High tech	483	539	3,972	1.2	24.8	11.7	0.3	0.1	0.3
Total Latin America	16,925	23,194	57,433	3.6	9.5	6.6	1.2	0.8	1.1
México									
Resource based	1,666	3,349	9,596	8.1	12.4	9.7	0.5	0.6	1.1
Low tech	0,926	1,871	25,337	8.1	33.6	19.0	0.4	0.4	2.9
Medium tech	1,428	7,318	62,427	19.9	26.9	22.0	0.3	0.7	3.5
High tech	2,057	1,183	46,928	-6.0	50.5	17.9	1.2	0.2	3.4
Total–México	6,077	13,721	144,288	7.7	28.1	16.5	0.7	0.6	3.0

Source: Lall, Albaladejo and Moreira (2004, table A.7).

^a Sixteen countries.

In 1980 Brazilian exports were a little more than half the rest of Latin America plus Mexico total (54.5%). A similar share was observed in 1990 (60%), but not in 2000: in this year Brazilian exports were on the order of 20% the rest of Latin America's exports (including Mexico). This means that growth rates of Brazil's exports were much lower than Latin America's in the 1990s, a performance that can be ascribed to Mexico's performance—which, in turn, can be attributed to North America Free Trade Agreement (Nafta).

Brazil fared worse than Latin America in all groups of products in the 1990s. The differences in exports growth rates are highest in the three first groups of products (RB, LT and MT). As a result, its world market share decreased over the 1980s—and was hardly maintained in the 1990s—while Latin America's increased substantially its share in the last decade, after having plunged in the former. Even so, the country was able to almost double its share of world trade in high tech products in the 1990s (from 0.28% to 0.50%), while for the rest of Latin America (except Mexico) it expanded by a factor of nearly 3 and Mexico by a factor of 17.

Comparative advantage also changed substantially in recent years, as exports surged and diversified following the exchange rate regime change. Table 10 shows Balassa's index of revealed comparative advantage (RCA) in 1995 and 2004 and changes in the index over these years. As shown, in 1995 the country displayed substantial RCA not only in RB activities—live animals, vegetables, fats and oils, minerals—but also in a few MT and HT activities as well, as exemplified by chemicals and transportation equipment and material. Nearly ten years later, in 2004, the situation had changed substantially. Brazil still exhibited strong RCA in RB products—indeed, with large positive gains in some of them, in addition to including food products, leather and hides, wood, paper and pulp, footwear, construction materials and basic metals to the group—but had lost advantage in chemicals, plastics and rubber products, textiles, electrical machinery and equipment and optical and precision instruments. The last column shows absolute changes in the RCA index, indicating that it increased in 13 activities and decreased in 9—one third of them in HT products.

These positive results are no doubt associated to export expansion after 2002, when the effects of the new exchange rate regime adopted in early 1999 began to be fully felt. They have also been associated to strong productivity gains in the 1990s, particularly following import liberalization in the beginning of that decade (see below). As it will be shown later on, however, real effective exchange rates have appreciated after 2002 as well. Efficiency gains brought about by import liberalization (plus the importance of sunken costs and increased commodity prices) have exerted a non-negligible influence on keeping export growth even during the recent phase of real effective exchange rates appreciation. It remains to be seen whether future export patterns and performance will follow recent past trends.

TABLE 10
1995 and 2004 revealed comparative advantage and changes over time
 (%)

HS sectors	Balassa RCA index		Shifts in RCA
	1995	2004	1995-2004
Live animals and related products	116	353	237
Vegetal products	173	458	285
Fats and animal and vegetal oils; product of their dissociation; food fats	128	398	270
Food products; beverages, inc. alcoholic; tobacco and tobacco products	83	413	331
Extractive minerals	156	126	-30
Chemicals and related products	140	51	-89
Plastics, rubber and their products	103	63	-40
Leather, hides and their products	55	201	147
Wood, vegetable coal and their works	9	287	278
Paper and pulp and their products	88	140	52
Textiles	66	40	-26
Footwear, hats and related products; artificial flowers	49	264	216
Cement, rocks, ceramic products and non-metallic minerals (construction)	62	132	70
Pearls, precious and semi-metals and stones, coins, jewelry	15	38	24
Basic metals	53	152	99
Machinery , electrical equipment, electronic sound and TV equipment	101	40	-61
Transportation material and equipment	125	112	-13
Optics and precision, medical equipment, musical instruments, watches	110	12	-99
Arms and ammunition, parts and accessories	50	169	118
Miscellaneous	54	56	2
Works of art, antiques	51	0	-50

Source: Trade Analysis System on Personal Computer: Harmonized System (PC-TAS) database, authors' calculations.

3 WHAT LIES BEHIND BRAZIL'S RECENT EXPORT BOOM?

3.1 STYLIZED FACTS

The previous section showed that after 15 years growing well below the world average, Brazilian exports experienced a resurgence in 2000-2005. In the above discussion, we suggested that this owed little to the diversification of the basket of exports, a process that had peaked in the seventies and eighties, when Brazilian industry was also developing more intensely. In this section we delve deeper into this issue, resorting to two different types of export-change decompositions and contrasting the recent export boom to previous similar episodes. Our main conclusion is that Brazil's remarkable export performance in 2000-2005 resulted mainly from the ability of incumbent exporters to *a)* benefit from the high growth in world trade, while increasing their market shares in some traditional markets (the

United States of America and Argentina, in particular); and *b*) regionally diversify the exports of traditional goods, in a process that can be dubbed as "new markets discovery".

Naturally, the recent export boom did not go unnoticed to Brazilian scholars, and from the existing literature and our own effort we can identify the following main stylized facts:

1) The favorable performance of world trade in this period, regarding both quantities and prices, was an important driving force behind Brazil's recent export boom—in 2000-2005, the growth rate of world imports, in current prices, was 7 p.p. higher than in 1995-1999 (table 2). By just managing to sustain its share of world exports at the 1999 level, Brazil would have been able to accelerate the average annual expansion of its exports from 0.8% to 10.4%. Obviously, this is easier said than done: Brazil had failed to do so in the previous 15 years. Moreover, a distinguishing aspect of this, as well as previous export booms has been the rise in Brazil's share in world exports, which indicates that there was more behind the export boom than just surfing the good performance of the world economy.

2) The rise in export prices—24% in 2000-2005—was an important factor behind the good export performance in this period, but not an explanation of why it excelled that of world trade, since the price of world imports also increased substantially—22% in the same period. Moreover, Brazilian export prices had contracted much more substantially than world import prices in 1996-1999 (table 2).

3) The increased competitiveness of agriculture was an important factor behind this boom, but other sectors also expanded their exports vigorously in this period. Thus, Markwald and Ribeiro (2006) note that the upturn in exports was led by primary goods, but only gained steam with the acceleration in the growth of manufacture and semi-manufacture exports after 2001, so that the share of agriculture in total exports remained relatively stable (see section 4). In particular, although the revealed comparative advantage of agriculture increased substantially between 1996 and 2004, so did that of auto vehicles, oil products and alcohol, other transport equipment (basically airplanes), and furniture (NASSIF; PUGA, 2004).⁴ Thus, the recent export boom was relatively widespread across sectors: only one (coffee) out of the 28 industries analyzed by Ribeiro and Pourchet (2004; 2005) showed a decline in its export/output ratio between 1999 and 2005.

4) The Brazilian performance was helped by the large increase in the number of exporters, although incumbent exporters accounted for the bulk of the increment in export values. Markwald and Ribeiro (2006) show that the number of exporters increased from 13.9 thousand in 1998 to 17.9 thousand in 2004, but highlight that a core group of 6.8 thousand firms that exported throughout this period accounted for 83% of the rise in exports, while new entrants answered for 31% and sporadic exporters for 2%; whereas drop-out exporters caused a 17% fall in exports. Thus, although entry

4. In turn, it declined in chemicals, metallurgy, machinery and equipment, and electrical products. Nassif and Puga (2004) use Lafay's revealed comparative advantage indicator, which is built in such a way that its cross-sector non-weighted average is zero, and captures the effects of both higher exports and lower imports. Focusing exclusively on the ratio of exports to output, they obtain particularly large increases in mining, wood, other transport equipment, furniture, non-metallic mineral products, oil products and alcohol, and electronic and communication materials.

was important, it was not the main driving force behind the export boom. Indeed, exports continued to rise in 2005, although there was a net exit of roughly one thousand exporters in the year (ZENDRON; CATERMOL, 2006).⁵ Furthermore, Markwald and Ribeiro (2006) show that large companies already engaged in exporting—808 in 1998 and 970 in 2004—⁶ accounted for 75% of the rise in exports from 1998 to 2004. That is, the rise in total Brazilian exports reflected mostly the 77% expansion in the mean value of exports per large company.

5) New export discoveries—products that were either not exported before (innovations) or that experienced a surge in export values (evolutions)—did not account for a significant fraction of the rise in exports. Rios and Iglesias (2005) results confirm the modest contribution of innovations—defined as goods exported in 2003-2004 but not in 1997-1998—to the total increment in export values in this period: there were 287 innovations, out of 4,612 goods exported, which accounted for 0.1% of the value of exports in 2003-2004. Markwald and Ribeiro (2006) identify only ten innovations in 2002-2004, with one of them (copper ore) accounting for 74% of their export value. In contrast, they counted 464 “evolutions”,⁷ for a total of 4,410 goods exported in 2004 (six-digit classification), adding US\$ 2.4 billion in exports in 2004, against US\$ 79.7 million in 2002, and answering for 7% of the increment in export value in this period. Yet, two ships refurbished as oil drilling platforms, accounted for as “exports”, but which never left Brazil, answer for over half the increment in “evolutionary” exports. These results contrast to some extent with those of a previous study, covering the 1997-2001 period, and which used a different, eight-digit product classification (total of 7,538 goods). In this case, Ribeiro and Markwald (2002) found 960 innovations, which accounted for 9.5% of the (much smaller) increment in total exports in this period. There were also 617 evolutions (defined in this case as goods with a 10-fold rise in export value), which answered for 0.2% of exports in 1997 and 11.9% in 2001. Overall, these evolutions accounted for 129% of the expansion in export value in this period, being partly compensated by goods that dropped out of the export basket or that recorded an involution in exports. A significant share of this increase is accounted for by the rise in the exports of oil and its derivatives. Thus, notably in 2002-2004, Brazil’s export boom stemmed essentially from the increase in the market shares of traditional exports, most of which were primary and semi-manufactured exports, or manufacture exports of capital goods and scale-intensive industries (MARKWALD; RIBEIRO, 2006).⁸

6) At the country level, though, innovations were much more important. In particular, Rios and Iglesias (2005) show that country specific innovations played a decisive role in non-traditional markets (table 11). In India and Russia, for instance,

5. Zendron and Catermol (2006) update and essentially confirm Markwald and Ribeiro’s (2006) results, concluding that a core group of 9,293 firms that exported every year in 2002-2005, out of 28 thousand that exported in at least one year, accounted for 94% of the rise in exports between 2002 and 2005.

6. Companies with more than 500 employees. This analysis considers only the 6.8 thousand recurrent exporters, revealing thus that 162 of them were upgraded from medium to large firms in this period.

7. Defined as goods whose exports expanded ten times as much, or more, as total exports in the period.

8. These include coffee, tobacco, soybeans and derived products, meats (bovine, swine and poultry), oil, wood, pulp, aluminum, leather, steel products, motors, tractors, vehicles and parts, and airplanes (MARKWALD; RIBEIRO, 2006).

they accounted for over half of the number of goods exported and a quarter of the value of exports in 2003-2004. Very few of these country-innovations were global innovations—less than 1% of the goods exported to non-traditional markets were global innovations. That is, almost all these country-innovations had been exported in 1997-1998 to other countries. An opposite situation was found in traditional markets, in which country innovations represented between 25% and 40% of the goods exported, but accounted for only between 1.9% and 5.1% of the value of exports to these countries. On the other hand, this was the group with the largest proportion of global innovations in the basket of exported goods. In particular, the United States of America and the EU seem to be the preferred testing places for new Brazilian exports. Finally, there is an in-between group of countries, in which we find China and a number of Latin American countries. Overall, innovations and evolutions at the country level were important drivers of the regional diversification of export markets, and contributed to sustain the level of Brazilian exports when prices and/or demand were falling in traditional markets such as the EU, Japan and Argentina in 1998-2002.

TABLE 11

Contribution of innovations to Brazilian exports: selected countries—2003-2004

(%)

	Country	Share of export value	Proportion of exported goods	Global innovations as a proportion of goods exported to country	Share of export increment between 1997-1998 and 2003-2004
Nontraditional markets	Algeria	49.3	78.6	0.31	57.7
	India	41.1	60.6	0.64	55.5
	South Korea	33.9	65.2	0.89	62.1
	Russia	25.2	63.9	0.52	45.5
	South Africa	23.7	50.0	0.44	34.4
	Morocco	24.6	47.3	0.24	71.7
	Thailand	22.5	54.4	0.49	41.7
In-between countries	Colombia	17.6	36.0	0.99	38.7
	Canada	16.9	48.2	0.69	35.0
	Chile	16.1	25.6	1.45	32.3
	Costa Rica	16.5	45.4	0.31	22.6
	China	15.4	59.2	1.09	19.3
	Saudi Arabia	15.2	56.0	0.34	32.2
	Venezuela	10.1	30.5	1.05	35.0
	Iran	9.1	79.4	0.40	14.3
	Mexico	9.1	38.4	1.00	12.5
Traditional markets	European Union	5.1	25.4	3.54	17.4
	Japan	3.9	38.6	0.90	102.4
	United States of America	1.9	27.4	2.67	3.9
Memo					
Argentina					10.4
Total exports (global innovations)					0.3

Source: Rios and Iglesias (2005).

These stylized facts are consistent with our view that one of the main driving forces behind the later export boom was the regional diversification of incumbent exporters. This is also consistent with Gomes and Ellery Jr.'s (2005) finding that in 1999 Brazilian exporters were in general present in only a few markets—48% of them in just one country, and 81% of them in five or less—a pattern that they observe was similar to that found in France (EATON; KORTUN; KRAMARZ, 2004). The authors regress the number of exporters present in each country against the size of the economy (domestic absorption) and the market share of Brazil's exports in each economy and conclude that cross-country differences in the value of Brazilian exports reflect more intensely the number of exporters than the average export value per firm in each country.⁹ Possibly, exporters reacted to the more favorable external market and the depreciated exchange rate by entering new markets with traditional export goods. At least in the case of agriculture, this was helped by stringent import barriers in traditional markets (section 4).

3.2 CONSTANT-MARKET SHARE (CMS) DECOMPOSITION¹⁰

The CMS method decomposition used in this section breaks export growth (or export change, in general) down into factors: *a*) related to world trade growth; *b*) due to structural change (i.e., shifts towards goods with above average world trade growth); *c*) related to countries of destination (i.e., shifts towards countries that experienced an increase in imports higher than the world average); and *d*) more directly linked to export competitiveness—for instance, a favorable exchange rate, high productivity and/or low external costs (labor, land, infrastructure etc.).¹¹ We apply this decomposition separately to seven sub-periods, the main economic developments of which were as follows:

1967-1973 – a period of fast GDP growth cum structural change, partly as result of economic reforms; a crawling peg exchange rate regime that kept the currency depreciated; export diversification; and substantial world economic and trade expansion;

1974-1979 – severe international turbulence in the wake of the first oil shock; higher world inflation and a large US\$ depreciation; lower and more variable GDP growth rates in Brazil; but with further sector diversification of industrial structure and exports;

1980-1984 – high world interest rates, strengthening of the US\$, and slowdown of world GDP growth; adjustment to the debt crisis, with low economic growth and a competitive exchange rate that helped to foster large trade surpluses and a continued diversification of exports;

9. More precisely, the elasticities of the number of firms to market share and size are, respectively, 0.72 and 0.60; against elasticities of 0.28 and 0.40 for the average export value per firm, respectively.

10. This subsection and the next draw extensively on Bonelli and Pinheiro (2006). The decomposition was based on 32 countries (or groups of countries) and ten sectors.

11. See Leamer and Stern (1970) for a description of the method, which is summarized in annex. Horta (1983) applied this method to Brazilian data for the 1970s. Bonelli, Franco and Fritsch (1993) used it to analyze changes in Brazil's competitiveness from 1979 to 1989. Their results are reviewed below.

1985-1989 – low world economic growth; maladjustments in the domestic economy, with a threat of hyperinflation and various heterodox price stabilization programs, export diversification continues;

1990-1995 – international recession in part of the period; implementation of several structural reforms, including trade liberalization, and, in July 1994, an exchange-rate-anchored price stabilization program, which prompted an exchange rate appreciation; little export diversification;

1996-1999 – marked by a semi-fixed, somewhat overvalued exchange rate, until January 1999, when the *real* was floated; declining (dollar) export prices and slow growth in world trade;

2000-2005 – post-devaluation period, with rapid expansion in world trade and substantial rise in (dollar) export prices.

In what follows, results are presented separately for 1967-1995 and 1995-2004, because we used a different database in each case: the Chelem, database for 1967-1995, and the PC-TAS database for 1995-2004.

3.2.1 1967-1995

Table 12 presents the results of the CMS decomposition for the sub-periods in 1967-1995 discussed above. As shown, the effect of world trade growth was relatively strong in all periods, albeit less so in 1979-1984, when world trade expanded at a much slower pace than in the rest of 1967-1995 (only 3.1% p.a., on average). As already mentioned, Brazilian exports rose more than world trade in this sub-period (1979-1984) and in 1967-1973. This explains why the world trade effect fell below total export change (i.e., the difference in total export values between the end-years in each sub-period) in these two sub-periods. In all other time intervals, this effect surpassed total export change, implying that Brazilian exports would have grown more, had they been able to keep their share in world trade. Summing up over the whole period, as shown in the last column, we see that Brazil's export growth exceeded that of world trade by only a slim margin in 1967-1995.

TABLE 12
CMS decomposition of Brazil's export growth
(US\$ million)

	1967-1973	1973-1979	1979-1984	1984-1989	1989-1995	Total
Growth of Brazil's exports (US\$ million)	4,432	9,281	10,567	8,818	11,455	44,553
World trade effect	3,226	11,324	2,584	14,807	22,233	40,626
Commodity composition effect	-481	-3,390	-1,029	1,024	-3,669	-20,697
Market distribution effect	-112	78	107	-3,097	3,490	581
Competitiveness effect	1,799	1,269	8,905	-3,915	-10,599	24,042

Source: Chelem database, authors' calculations; see text.

This difference stems from a combination of a large and negative commodity composition effect and an equally large but positive competitiveness gain. The first was negative in almost all sub-periods—except for 1984-1989—meaning that Brazil's

exports in 1967-1995 were mostly concentrated on goods with below average world trade growth. Measured as a proportion of total export change, we see that this gap was particularly pronounced in 1973-1979 and, to a lesser extent, 1989-1995, whereas between 1984 and 1989 this effect contributed to boost Brazil's exports. The market distribution effect did not affect much Brazil's export growth except in: *a*) 1984-1989, when its main export markets showed a below average import performance; and *b*) 1989-1995, when the contrary happened. Its net influence in the overall 1967-1995 period was, though, small.¹² The competitiveness effect, in turn, resulted positive and reasonably large, but concentrated in just three out of the five sub-periods shown, all of which in 1967-1984. In particular, in the 1985-1995 decade Brazil's relatively slow export growth was associated with a fall in competitiveness. This was especially true in 1989-1995.

Given the additive character of the CMS decomposition, it is possible to express the effects as percentages of the total export change (or, if we wish, as percentages of the total growth rate in each sub-period), as in table 13. Seen from this angle, Brazil's export competitiveness seems to have improved markedly in 1967-1984, a period of substantial export diversification, before receding in 1984-1995. The competitiveness effect was especially significant in 1979-1984 and 1967-1973, when it accounted for 84.3% and 40.6% of the total growth of exports, respectively. On the other hand, the drop in competitiveness was especially large in 1989-1995, when it subtracted 92.5% of the total export change, despite strong productivity and efficiency improvements in the early 1990s. Netting up the effect of changes in competitiveness in 1967-1995, we find that this effect accounted for 54% of the expansion in exports, second only to the world trade growth effect (+91.2%).

TABLE 13
CMS Sources of growth—1967-1995
(% of total change)

Effects	1967-1973	1973-1979	1979-1984	1984-1989	1989-1995	Total
World trade effect	72.8	122.0	24.5	167.9	194.1	91.2
Commodity composition effect	-10.8	-36.5	-9.7	11.6	-32.0	-46.5
Market distribution effect	-2.5	0.8	1.0	-35.1	30.5	1.3
Competitiveness effect	40.6	13.7	84.3	-44.4	-92.5	54.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 12.

Because the above decomposition used data in current prices, and changes in absolute and relative prices are likely to partly explain the importance of the effects described above, we re-examined the changes in export value in the different sub-periods separating out three distinct effects: quantum (i.e., constant price), world

12. One feature of the CMS method is that the order in which the decomposition is performed matters in the case of the commodity composition and market distribution effects. Depending on which of the factors is extracted first, the magnitudes of the components may vary. Their sum, however, is the same, irrespective of the order in which the decomposition is performed. See annex.

price, and relative price changes. These are represented, respectively, by the three elements on the right-hand side of the following expression:

$$\frac{1}{k}(V^{t+k} - V^t) = \frac{1}{k} \left[\frac{1}{2}(P^{t+1} + P^t)(Q^{t+1} - Q^t) \right] + \frac{1}{k} \left[\frac{1}{2}(Q^{t+1} + Q^t)(P_*^{t+1} - P_*^t) \right] + \frac{1}{k} \left[\frac{1}{2}(Q^{t+1} + Q^t) \left[(P^{t+1} - P^t) - (P_*^{t+1} - P_*^t) \right] \right]$$

where V^t , Q^t , P^t and P_*^t are the value and quantum of exports and the price of Brazilian and world exports in year t ; and for every sub-period we fixed $P^t = P_*^t = 1$.¹³

Table 14 shows that one of the main reasons why Brazil's export performance fell short of the world average in 1973-1999 was the decline in its relative export prices. Moreover, the notable performance of 1979-1984, when Brazilian exports rose above the world average, stemmed entirely from a large increase in the quantum of exports, for Brazilian export prices fell very substantially in this period, vis-à-vis the average of world export prices. To some extent, the net negative contribution of the composition effect described above was the result of this poor performance of Brazil's export prices.

TABLE 14
Quantum and price decomposition of export growth—1967-2005
(Million US\$ per year)

	Effects				Relative contributions (%)		
	Quantum	World price	Relative price	Total	Quantum	World price	Relative price
1967-1973	418	178	163	758	55	23	22
1973-1979	410	1,402	-305	1,507	27	93	-20
1979-1984	2,462	718	-827	2,352	105	31	-35
1984-1989	897	844	-265	1,476	61	57	-18
1989-1995	1,508	928	-415	2,021	75	46	-21
1995-1999	2,756	-1,852	-528	376	733	-493	-140
1999-2005	8,873	2,579	265	11,716	76	22	2

Sources: Funcex, IBGE and IFS/IMF.

How do our results compare to those of authors who also applied the CMS decomposition to the 1970s and 1980s? This comparison seems interesting because these studies separated out manufacture from total exports, and thus complement our decomposition, even if the choice of sub-periods is not the same. Horta (1983) decomposed Brazil's export growth between 1970 and 1978, considering the periods before and after the first oil shock separately, and excluding oil and fuels. Her results are summarized in table 15, and roughly agree with ours. In particular, they show that the world trade effect was more significant prior to than after the first oil shock, whereas the

13. Note that this exercise, differently from the CMS decomposition, uses only aggregate data, which differs somewhat from the totals obtained using the Chelem and PC-TAS, which cover only the most important goods and market destinations.

opposite happened to the competitiveness effect, while the commodity composition effect became more important in the second sub-period, possibly reflecting a negative relative price effect. A similar result is observed looking separately at manufacture exports, but the magnitudes are quite different, with the competitiveness effect, rather than that of world trade, becoming the main factor behind the expansion of exports. Moreover, the commodity composition effect was not significant in the case of manufactures. The country of destination effect was also small or negligible in manufactures in both sub-periods. These results suggest that export diversification towards manufacture goods gave an important contribution to the expansion of Brazil's exports in the 1970s.

A similar exercise was performed by Bonelli, Franco and Fritsch (1993) for the 1980s (between 1979 and 1989) and selected sub-periods. Results as percentages of total and manufacturing trade growth are shown in table 16. For the whole period, gains in competitiveness account for roughly one-third and half, respectively, of the growth in total and manufacture exports. But it is apparent from the table that in both cases the importance of the competitiveness effect declined substantially between the first and second half of the decade (actually, between 1979-1984 and 1985-1989). A competitive exchange rate, notably after the large devaluation in early 1983, played a major part in ensuring this performance, especially if we take into account the fact that the world economy (and world imports) hardly grew in the first half of the 1980s.¹⁴ Besides the favorable exchange rate, Brazilian exporters also benefited in the late 1970s-early 1980s from export subsidies, tax credits and other export promotion policies adopted in the 1970s, before they were progressively discontinued in the 1980s, and the conclusion of large investment projects in capital intensive sectors such as steel, paper and pulp, and capital goods. This allowed Brazil to successfully increase its penetration in world markets, particularly of manufactured goods.

TABLE 15
CMS decomposition results and selected sub-periods—1971-1978
(%)

Sources of growth of Brazil's exports (as % of exports growth rates)			
Periods	1971-1978	1971-1974	1974-1978
Effects	Total (except oil and fuels)		
Total	100.0	100.0	100.0
World trade growth	71.4	64.8	100.9
Commodity composition	-9	-0.1	-20.0
Market distribution	-1.5	-13.6	1.0
Competitiveness	29.1	48.9	18.1
Effects	Manufactures		
Total	100.0	100.0	100.0
World trade growth	30.2	33.7	57.2
Commodity composition	-0.1	0.2	-0.1
Market distribution	-3	-4.5	0.2
Competitiveness	73.8	70.6	42.7

Source: Horta (1983); columns add to 100%, except for rounding.

14. World imports went from US\$ 2,024 billion in 1980 to US\$ 1,964 billion in 1984. Source: IMF database and Ipeadata.

TABLE 16

Sources of growth of Brazil's exports – 1979-1989 and selected sub-periods

(% of growth rates of export)

	1979-1984	1984-1985	1985-1989	1979-1989
Total trade	100.0	100.0	100.0	100.0
World trade growth	22.0	-134.0	193.1	81.7
Commodity composition	-10.9	14.9	16.8	-4.1
Market distribution	2.0	34.0	-28.6	-11.6
Competitiveness	87.1	187.2	-81.3	33.9
Trade of manufactures (SITC 5 to 8)	100.0	100.0	100.0	100.0
World trade growth	23.9	-1,557.1	116.5	62.1
Commodity composition	-2.7	271.4	0.3	-2.6
Market distribution	4.5	285.7	-23.3	-9.4
Competitiveness	74.5	1,100.0	6.6	49.9

Source: Adapted from Bonelli, Franco and Fritsch (1991).

Thus, changes from the first sub-period to the next were remarkable: they suggest that, vis-à-vis total export growth, Brazil's competitiveness gain decreased (total exports) or was nearly stagnant (manufacturing). Again, one should not overlook the importance of the exchange rate appreciation after 1984-1985, under severe macroeconomic disequilibria, especially strong inflation acceleration. It is also fitting to observe that the market distribution effect was negative in all cases reported above, meaning that Brazil concentrated its exports on countries whose imports grew less than the world average—a result stressed by our analysis, above. Finally, the comparison between the decomposition results for total and manufacture exports confirms once more the relevance of the diversification towards manufacture goods as a means to sustain the expansion of Brazilian exports, despite the below average rise in export prices.

3.2.2 1995-2004

This section extends the previous analysis to the post-1995 years, subdivided into 1995-1999 and 1999-2004. The reasons for such a breakdown are three-fold: first, because the series in our version of the Chelem database end in 1997 (and 1995-1997 is not a very meaningful phase); second, because 1995-1999 is a roughly homogeneous sub-period as far as economic policy (and especially exchange rate policy) is concerned, deserving special interest; third, because access to the PC-TAS database after 1995 allows us to perform a different—and, in a sense, more complete, because of the finer sector and country compositions permitted by the use of the new database—decomposition exercise to analyze changes in the Brazilian insertion into the world economy.

Brazil experienced only modest export growth between 1995 and 1999 (table 17). As a result, the decomposition of total export change produces comparatively large (and somewhat distorted) figures. Despite the relatively low growth of world trade in this period, its contribution to foster Brazilian exports was distinctively

positive. Indeed, had Brazil's exports grown at the same rate of world trade, they would have expanded about 8 times as much as observed.¹⁵ The results also show that in 1995-1999 Brazil was able to direct its exports to relatively dynamic goods and markets, as expressed in the positive commodity composition and market distribution effects. There was, though, a general loss of competitiveness, as depicted in the very negative residual term, revealed a loss of market share. A partial explanation for this highly negative competitiveness effect may be the drop in Brazilian exports prices, which exceeded that of world imports (table 14), and might not have been fully captured in the commodity composition effect. Indeed, a remarkable feature of Brazil's exports in 1995-1999 was the low expansion in their value, despite the very substantial rise in the quantum of exports.

TABLE 17
Sources of growth of Brazil's exports—1995-2004
(US\$ 1,000 and %)

	1995-1999		1999-2004		1995-2004	
	Value (US\$ 1,000)	Share (%)	Value (US\$ 1,000)	Share (%)	Value (US\$ 1,000)	Share (%)
Total change in Brazil's exports	512	100	48,817	100	49,329	100
World trade growth effect	4,234	827	31,357	64	38,138	77
Commodity composition effect	679	133	-1,711	-4	1,690	3
Markets distribution effect	6.119	1,195	-5.476	-11	3.088	6
Competitiveness effect	-10.519	-2,055	24.648	51	6.414	13
Memo: world trade growth (%)	9,4		68,4		84,2	

Source: PC-TAS database, authors' calculations.

The situation changed markedly after 1999. Brazil was able to improve its share in world exports even amidst fast world trade growth. Still, the latter accounted for a sizeable 64% share of the total change in export values in 1999-2004. Both the commodity composition and market distribution effects were negative between 1999 and 2004, meaning that in 1999 Brazil concentrated its exports on goods and markets that grew less than the world average. This component is especially significant as far as the market distribution effect is concerned, as it subtracted 11.2% from the total change, while the commodity composition effect subtracted only 3.5%. This result probably stems from the initial high share of Brazil's exports to the EU, Japan and Mercosur, which expanded below average, whereas the large increase in exports to China, Mexico and other less traditional markets was captured in the residual term. Similarly, the commodity composition effect does not fully capture the impact of the large increase in export prices in this period (table 14), for some of the goods that benefited the most also expanded their share in total exports during this period (e.g., iron ore). Both these changes are captured in the residual term and

15. Use of actual Brazilian exports totals—and not PC-TAS database totals—would reveal a different picture (but not much) because PC-TAS totals grew less than total Brazilian exports: its share in total exports decreased from 97.4% in 1995 to 95.4% in 1999.

reflected in a large competitiveness increase. Indeed, this effect answered for 50.5% of total export growth.

Looking next to the overall period (1995-2004), we observe that, as in 1999-2004, the large expansion of Brazilian exports matched to a large extent that of world trade, as reflected on the 77% share of this effect yielded by the CMS decomposition. But, contrary to 1999-2004, both the commodity composition and the market distribution effects resulted modestly positive (with shares of 3% and 6%, respectively) due to changes in the first sub-period. The overall competitiveness effect accounted for 13% of total export change in this period.

3.3 DEMAND-PULL, PRICE MARK-UPS, MARKET-SHARE AND BASKET COMPOSITION EFFECTS

Like the above exercise, the second decomposition we use to analyze export performance separates out the effect of an increase in demand from changes in Brazil's participation in each country's overall imports. But it further decomposes this second element into an enlargement in the basket of exported goods and changes in the market share or the relative price of goods previously exported, with the latter possibly reflecting unmeasured changes in relative quality at the product level. This decomposition, the methodology of which is described in greater detail in annex, builds on Hummels and Klenow's (2005) differentiation between extensive and intensive margins. However, rather than comparing different countries at a certain point in time, we contrast the same country in different moments in time, which brings in the effect of changes in demand. Thus, we decompose the mean log-change of Brazil's exports to country m from t to $t+k$, which is on the left-hand side of the next expression, into:

$$\frac{1}{k} \ln \left(\frac{V_m^{t+k}}{V_m^t} \right) = \frac{1}{k} \ln \left(\frac{V_m^{*t+k}}{V_m^{*t}} \right) + \frac{1}{k} \ln \left(\frac{P_m^{t+k}}{P_m^t} \right) + \frac{1}{k} \ln \left(\frac{X_m^{t+k}}{X_m^t} \right) + \frac{1}{k} \ln \left(\frac{EM_m^{t+k}}{EM_m^t} \right)$$

a) The concomitant log-change in country m 's imports—proxied in the first term of the right-hand side of the above expression by the growth of rest-of-the-world (RoW) exports to m —which measures what would have been the change in Brazilian exports to that country had its share of m 's imports remained constant (that is, assuming an elasticity of demand equal to one).

b) A component reflecting the log-change in the price margin of Brazil's exports relative to that of exports from the RoW, calculated as a weighted-average of the relative price of each export good, that can reflect either a higher pricing power or better export quality.

c) A component measuring the log-change in Brazil's share of m 's import market, gauged in quantity terms, again calculated as a weighted-average of Brazil's share in m 's imports of each good.

d) A final term measuring the change in Brazil's export basket, evaluated by the importance of goods exported by Brazil in RoW exports to country m , the extensive

margin. Thus, it is a measure of export diversification akin to Rios and Inglesias's (2005) concept of country specific innovations.

Using a Divisia-Tornqvist index to aggregate over markets, it is possible to decompose the average annual log-change of total exports between two periods according to different markets and effects using the following expression:

$$\frac{1}{k} \ln \left(\frac{V^{t+k}}{V^t} \right) \approx \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{V_m^{t+k}}{V_m^t} \right) = \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{V_m^{*t+k}}{V_m^{*t}} \right) + \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{P_m^{t+k}}{P_m^t} \right) + \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{X_m^{t+k}}{X_m^t} \right) + \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{ME_m^{t+k}}{ME_m^t} \right)$$

where:

$$\alpha_m = \frac{\alpha_m^t + \alpha_m^{t+k}}{2}$$

We applied this decomposition to Brazilian exports in 1995-2004, using data from the-PC-TAS, data set produced by the United Nations Conference on Trade and Development (UNCTAD).¹⁶ This data set contains information on the trade flows (value and quantity) of approximately 5,400 products goods and a large (and variable) number of countries—prices were proxied by unit values. We applied the above expressions to Brazil's 36 main export markets. A complete list of these countries/regions is provided in appendix B, which also reveals that they accounted for 91% of the log change in Brazil's exports from 1995 to 2004 (and, on average, for the same proportion of total exports in the extreme years). All other countries were grouped on a "other destinations" category, for which we are able to measure only the effect of changes in import values. Table 18 shows the results of this decomposition for 1995-2004, separating out the sub-periods 1995-1999 and 1999-2004.

From the table we learn that world trade growth (total imports of all countries considered in the analysis) is the single most important effect in the two sub-periods as well as for the total decade. From its lower part we observe that, for the period 1995-2004 as a whole, world trade growth accounted for 69% of Brazil's export growth. Diversification ("basket" effect, or the extensive margin) was second in importance, accounting for 31% of export change. Changes in price margins and quantity effects were of lesser importance and compensated each other. This indicates that the quality of goods exported decreased somewhat, while the quantity effect was modestly positive (-2 and +2%, respectively, for the whole period results).

Decomposition results for the sub-periods shown in the table are very different, as expected from the analysis in the last sub-section. Indeed, for 1995-1999, when Brazil's exports expanded by a mere 5%, world export growth proceeded at a much higher pace. Diversification represented the second factor, followed by (modest) price

16. We thank Fundação Centro de Estudos do Comércio Exterior (Funcex) for giving us access to this data and Henry Pouchet for his excellent research assistance in actually implementing the decomposition.

margins increases, which represent quality improvements. The market share (quantity) effect was negative.

TABLE 18
Logarithmic decomposition of export growth—1995-2004
 (Annual averages, %)

Periods	Total mean log-change in exports (considering all export markets)	Mean log-change in exports to 36 main export markets	Effects (considers only 36 main export markets)				Mean log-change in exports to other destinations
			Demand pull effect (mean log-change in country imports)	Price mark-up effect	Market-share effect (quantity)	Basket composition (extensive margin)	
1995-1999	0.8	1.2	3.1	0.7	-3.4	0.9	-0.4
1999-2004 (excl. Russia)	13.8	12.5	6.4	-0.9	3.9	3.1	1.3
1999-2004 (incl. Russia)	14.0	12.7	6.6	-0.9	3.7	3.3	1.3
1995-2004 (excl. Russia)	8.1	7.4	5.1	-0.1	0.1	2.3	0.7
Relative contributions							
1995-1999		100	252	55	-277	70	
1999-2004 (excl. Russia)		100	51	-7	31	25	
1999-2004 (incl. Russia)		100	52	-7	29	26	
1995-2004 (excl. Russia)		100	69	-2	2	31	

Source: Appendix B.

From 1999 to 2004, however, after exchange rate devaluation, effects had very different weights. Growth of world imports was the most important factor (accounting for 51% of Brazil's 69% export growth), followed by a quantity effect that came to represent nearly 30%. This means that Brazil was able to penetrate foreign markets due to strong increases, or deepening of existing markets. In the third place we find the diversification effect, with one-fourth of the total exports growth rate. The price margins effect resulted slightly negative in this period, indicating a relative decrease in the quality of goods exported, or that Brazilian exporters took advantage of a depreciated exchange rate to reduce average price margins—counterbalancing the fact that strong foreign demand and a commodity prices boom made for better prices of a number of important goods in Brazil's export basket.

Being the above exercise the result obtained from a sample of 36 countries (35 in 1995-1999, which excludes Russia), it is only natural that we find that the relative importance of the causal factors differ among destination markets. This is shown in table 19, which displays information on the ten countries that contributed the most to the expansion in Brazilian exports from 1995 to 2004. From the information on the dez largest partners—that accounted for 72% of all export growth (albeit representing 67% of average export levels)—we learn that, as we found out for the total, Brazil was primarily “pulled” by foreign demand. Indeed, in nearly all cases (the exception being Argentina) shown in the table imports from the countries represented the single most important factor behind Brazil's export growth.

Consider, for instance, the United States, which accounted alone for a quarter of the log-change in Brazil's exports between 1995 and 2004. In this period, Brazil's exports to the United States expanded an average 9.5% per year, but United States imports themselves increased annually 7.3%, so demand-pull was possibly the strongest force behind the expansion of Brazil's exports to the American market. This example highlights the relevance of import growth, not only in the United States, but in Mexico, China, Chile and Spain as well, as an explanation of its good export performance in this period. The quantity index of Brazil's exports to the United States, in turn, increased 1.7%. The introduction of new products (the basket composition, or goods diversification effect) added another 1.1 p.p. to the expansion of Brazilian exports to the United States market. Price margins, in turn, gave a negative contribution (−0.6 p.p. per year), as was the case with most other trade partners.

The picture for the second largest contributor, China, is slightly different in the sense that besides its strong import growth (average log-change of 15.8% per year), Brazil was able to substantially diversify its exports, with the extensive margin adding another 9.3 p.p. to it, and coming to answer for 43% of Brazil's total export growth to China (log-change of 21.7% per year). Both quantity (market-share) and price (mark-up) effects resulted negative, though, with negative contributions of −2.3 p.p. and −1.1 p.p. p.a., respectively.

TABLE 19
Logarithmic decomposition of export growth, Brazil's ten largest partners–1995-2004
 (Annual averages, %)

Countries	Mean log-change in exports to each country	Demand pull effect (mean log-change in country imports)	Price mark-up effect	Market-share effect (quantity)	Basket composition (extensive margin)	Weighted average	As % of total	Average weights
United States of America	9.5	7.3	−0.6	1.7	1.1	2.3	24.9	23.7
China	21.7	15.8	−1.1	−2.3	9.3	1.4	15.4	6.4
Mexico	22.5	10.6	11.3	−2.8	3.4	0.7	7.6	3.1
Argentina	6.4	−0.4	−1.2	8.5	−0.5	0.6	6.5	9.2
Germany	4.9	4.5	0.6	−2.7	2.5	0.4	3.9	7.1
Chile	9.2	3.7	0.6	2.6	2.3	0.3	3.0	3.0
Netherlands	6.6	4.6	0.8	−1.1	2.3	0.2	2.7	3.8
United Kingdom	6.9	6.1	−0.6	−0.1	1.6	0.2	2.6	3.4
Italy	5.4	5.8	−1.2	−1.6	2.4	0.2	2.6	4.3
Spain	8.2	9.0	−1.4	−5.0	5.6	0.2	2.4	2.6

Source: Appendix B.

Exports to Mexico, the third most important contributor to the expansion of Brazilian exports, grew the most in this period: a log-change of 22.5% p.a.¹⁷ Contrary

17. This rise stemmed largely from the expansion in auto vehicles and parts, which accounted for two-thirds of the increment of exports to Mexico from 1998 to 2004, in turn a result from the trade agreement between the two countries (MARKWALD; RIBEIRO, 2006).

to the United States, China, and most of the remaining cases shown in table 19, the change in price margins made a strong positive contribution (11.3 p.p. p.a.), answering for nearly half of the total rise of exports to Mexico. It suggests that the relative quality of Brazil's exports to Mexico improved considerably—something that may be explained by increased exports of high-tech goods such as cars, parts and components. The increase in Mexico's own imports was strong, suggesting again that the rise in Brazilian exports to it was demand-pulled—which once more points to the risk of a substantial worsening of Brazil's export performance if growth of world imports slows down. Indeed, of all countries shown in table 19, only Argentina, the fourth most important contributor the rise in Brazil's export in this period, had (nearly) stagnant imports in this period. In this particular case, all the rise in Brazilian exports stemmed from an increase of market shares (i.e., mostly trade diversion). Diversification accounted for nearly nothing and the price effect was negative.

It is fitting to observe that, except for Argentina, the extensive margin for Brazil was positive and very large for most countries in table 19, such as China, Spain, Mexico, Germany, Chile and the Netherlands. This suggests that diversification at the country level was an important driver behind Brazil's improved export performance in this period. However, in no case was this effect as large as the increase in country imports. The price margin effect of Brazil's exports, although being on average slightly negative over the whole period, was found to have been positive in the cases of Mexico, Germany, Chile and the Netherlands, countries also marked by the diversification of exports, as measured by the extensive margin.

4 AGRIBUSINESS EXPORTS: OPPORTUNITIES AND CHALLENGES¹⁸

4.1 BRAZIL AS AN AGRICULTURAL POWER IN WORLD MARKETS

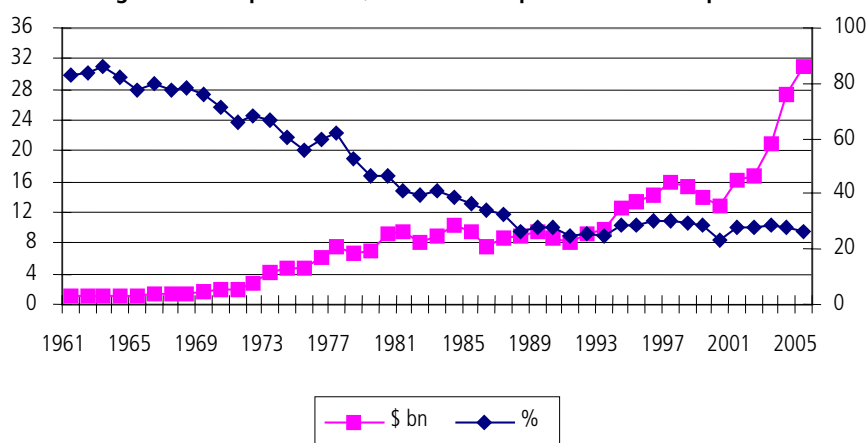
Brazil's agriculture has traditionally been more export-oriented than the manufacturing industry, accounting for 26% of the country's exports in 2005 (almost thrice its share in GDP). However, between the early 1960s, when the last phase of ISI began, and the early 1990s, when trade liberalization moved domestic terms of trade back in favor of agriculture, its share of total exports declined almost steadily, stabilizing since the late 1980s around 28% (figure 5).¹⁹ In the sixties and seventies, exports of agricultural goods expanded in nominal terms, although not as fast as manufactured exports, but in the 1980s they actually fell. As noted before, to some extent this differential performance reflected the higher dollar inflation in the 1970s, while in the 1980s the strengthening of the dollar caused export prices to rise much more slowly. This is clearly shown in figure 6: in 1971-1979, the price of Brazil's agricultural exports more than doubled, whereas in 1980-90 it fell most of the time.

18. This section draws partly on OECD (2005).

19. This contrasts with ratios of agricultural to total exports of 6.5% in Canada, 7.8% in the United States, 26.0% in Australia, 45.8% in Argentina, and 6.7% for the world as a whole.

In the early 1990s, with trade liberalization and other policy reforms, agriculture exports went up vigorously, only to drop again, together with overall exports, with the currency appreciation in the early years of the Real Plan. As highlighted in figure 6, though, this drop stemmed exclusively from the 43% contraction in agriculture export prices between 1997 and 2002, in the wake of the Asian and Russian financial crises, and the ensuing deceleration in world GDP growth.²⁰ Indeed, in this period, despite falling prices, agriculture export quantities went up a remarkable 81%, partly as a consequence of the 1999 exchange rate devaluation. In the following years, with the acceleration in world economic growth, quantities and prices increased and the value of agriculture exports rose strongly—in this case, in tandem with non-agricultural exports. As a matter of fact, despite this large expansion the share of agriculture in total exports declined slightly, from 28% in 2002 to 26% in 2005 (table 21). This substantial rise in exports partly explains the good performance of the agriculture sector in the last fifteen years: from 1991 to 2005, its GDP grew annually an average 3.5%, against 2.1% in industry and 1.8% in services.

FIGURE 5
Brazilian agricultural exports in US\$ billion and as percent of total exports—1961-2005



Sources: Food and Agriculture Organization (FAO), Ministry of Agriculture and Funcex.

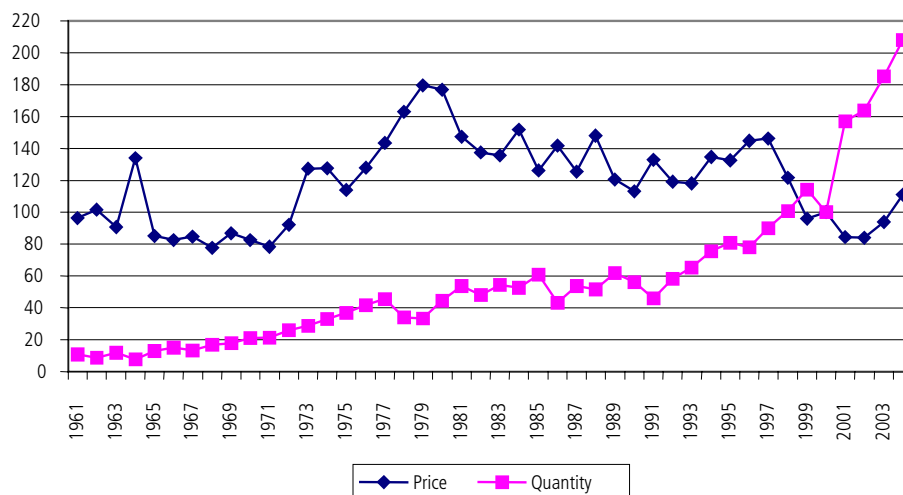
As of 2005, Brazil had become one of the world's largest agricultural exporters. In quantity terms, it is now the world's leading exporter of soybeans, sugar, coffee, beef and veal, poultry, orange juice and tobacco, and the second largest of soybean oil and meal (table 20).²¹ In addition, it answers for a substantial share of world trade in wood and leather, including derived products. Brazil is also the world's largest producer of coffee, sugar and orange juice, and the second largest of tobacco, soybeans and beef. But the export orientation of Brazil's agriculture is not uniform across products: while in some cases, notably orange juice, most output is exported, in others the lion share of production goes to the domestic market, as in the case of meat. In other, less export-oriented crops, such as rice, wheat and dairy products, the share of domestically consumed output is even larger. Overall, despite the recent export boom, only about a third of agricultural production is sent to foreign

20. In particular, coffee prices fell 76% in United States dollar terms in this period.

21. Brazil's exports of uncrushed soybeans exceed those of oil and meal due to domestic reasons (less productive crushing facilities than neighboring Argentina and perverse tax incentives) and tariff escalation in major markets.

markets compared with 41% in Canada, 74% in Australia, and 22% in the United States. The domestic market is expected to remain the main destination of agricultural output in Brazil (OECD, 2005).

FIGURE 6
Price and quantity indices for Brazilian agricultural exports—1961-2004
(2000 = 100)^a



Source: FAO.

^a Price index calculated using United States dollar prices.

TABLE 20
Brazil's role in world agriculture 2005 crop
(%)^a

	Production		Exports		Exports/output (%)
	% of world	Ranking	% of world	Ranking	
Soybeans	25.3	2	39.1	1	46.7
Soybean oil	15.8	4	24.5	2	42.1
Soybean meal	15.3	4	26.7	2	59.6
Cotton	4.1	6	3.5	6	88.3
Centrifugal sugar	18.7	1	34.7	1	62.6
Coffee	32.0	1	28.1	1	66.6
Pork	3.0	4	15.2	4	27.2
Beef and veal	16.4	2	26.5	1	21.7
Poultry	15.9	3	41.0	1	29.3
Orange juice	59.2	1	82.7	1	97.5
Corn	5.9	4	1.3	6	2.4
Tobacco leaves ^b	13.4	2	23.7	1	65.9

Sources: United States Department of Agriculture (USDA) and FAOSTAT data, 2006.

^a Proportions and rankings calculated using USDA's preliminary figures for quantities of each product.

^b Share of world exports and exports/production refers to 2004.

The recent boom in agriculture's exports was very diversified in both composition and direction of trade, and this has been one of its strengths. The country has a geographically varied climate, with both tropical and temperate zones, the potential of which had not hitherto been fully exploited as a source of comparative advantage. This seems to be changing. As shown in table 21, the value of all of Brazil's main agricultural exports, except for fruit juice, at least doubled between 2000 and 2005, with a significant diversification away from typical tropical products, such as coffee, sugar and orange juice. The main contribution for the rise in agricultural exports in this period came from meat (31%), followed by soybeans and derived products (29%), and sugar (15%).²² This marked a break with the relatively high concentration of export growth, notably in the 1980-2000 period, when soybeans and derived products (56%) and fruit juice (21%) accounted for over three-fourths of the rise in agriculture's exports. As a consequence, the composition of agricultural exports changed significantly, with its HHI index, calculated using a four-digit harmonized system classification, declining from 0.105 in 1996 to 0.089 in 2005.

TABLE 21
Brazil's agricultural exports: selected products—1980-2005
(US\$ million)

	1970	1980	1990	1996	2000	2002	2004	2005	Contribution to 2000-2005 rise (%)
Soybeans	27	394	910	1,018	2,188	3,032	5,395	5,345	17
Coffee green + roast	939	2,486	1,106	1,722	1,563	1,201	1,759	2,533	5
Sugar (raw equiv.)	127	1,288	525	1,611	1,199	2,094	2,640	3,919	15
Fruit juice	17	366	1,505	1,456	1,092	1,098	1,143	1,185	1
Cake of soya beans	44	1,449	1,610	2,731	1,653	2,199	3,271	2,865	7
Oil of soya beans	1	421	334	713	359	778	1,382	1,267	5
Beef and veal	70	18	100	194	503	776	1,963	2,419	11
Meat of swine	1	0	22	122	163	469	744	1,123	5
Poultry meat	0	209	338	886	904	1,498	2,813	3,632 ^e	15
Tobacco leaves	32	290	566	1,029	813	978	1,380	1,660	5
Cotton lint	154	11	128	2	32	94	406	450	2
Maize	81	1	0	72	9	268	597	121	1
Ethanol	n.a.	n.a.	n.a.	95	35	169	498	766	4
Total agriculture	1,946	9,320	8,764	14,308	12,761	16,726	27,215	30,961 ^e	
Memo									
% of world agricultural exports	3,7	4,0	2,7	3,1	3,1	3,8	4,5		
Brazil agriculture/total exports	71,1	46,3	27,9	30,0	23,2	27,7	28,2	26,2	

Sources: FAOSTAT data, 2006; Ministry of Agriculture and IBGE.

e = estimate based on Ministry of Agriculture's data.

n.a. = non-available.

22. As noted by Ferreira (2005), the 44.7% rise in beef output in 1996-2005 was largely destined to exports, which went up 654%, against an expansion of just 6.0% in domestic per capita consumption. This rise in exports was accompanied by a sharp decline in dollar prices: 65% in 2000-2005.

Another reinforcement of historical patterns, and a positive feature of the recent boom, has been the diversification of export destinations, away from the EU, the United States and Japan—which, however, still account for about half of Brazil’s agricultural exports. Thus, over half of the increment in agricultural exports in 2000–2004 was destined to countries that answered for less than a third of this total in 2000 (table 22). This was critical to overcoming the limitation imposed to agricultural exports by high tariff and non-tariff barriers in Organisation for Economic Co-operation and Development (OECD) countries.

TABLE 22
Distribution of Brazil’s agriculture exports by destination
 (%)

	1996	2000	2004
European Union (25)	51	46	38
United States	11	9	7
Japan		5	4
China	5	3	9
Russian Federation		3	6
India		1	1
South and Central America		9	5
Middle East		7	10
Africa		4	7
Others		13	14
World	100	100	100

Sources: Ministry of Agriculture and WTO.

4.2 THE COMPETITIVENESS OF BRAZIL’S AGRICULTURAL SECTOR

In 1991–2005, Brazil’s share in world agricultural exports rose from 2.7% to 4.5%, well above its participation in total world exports. Several factors contributed to enhance the competitiveness of Brazilian farmers: the positive effects stemming from policy reforms; public-financed investments in technology, human capital and infrastructure; and short-term positive shocks. These factors fostered a major improvement in productivity and a more intense use of capital and intermediate imported inputs, the price of which fell with trade liberalization. This rise in productivity largely explains the increase of agricultural output in this period—expanding the agricultural area in order to expand output was only necessary in the current decade. The fact that since the 1970s the sector had been fairly active in exporting, relying on information and channels to distribute its products, facilitated its reaction to a less restrictive business environment and helps to explain why it was so successful in selling to foreign markets.

The remarkable performance of agriculture, relative to industry and services, in the last 15 years owes much to the structural reforms of the 1990s, especially trade liberalization and the elimination of quantitative restrictions (licenses, quota and

taxes), reducing the implicit taxation of agriculture (FUSCALDI; OLIVEIRA, 2005; OECD, 2005).²³ Until the late 1980s, agro-food imports were subject to high tariffs, quantitative restrictions, importer advance deposits (replaced later by an import transaction tax), licensing and import authorization requirements. Agro-food exports were at times restrained, at times encouraged, depending on the particular economic and political context. In some periods Brazilian agro-food exporters faced export duties and quantitative restrictions; in others, they enjoyed export credits and tax benefits.²⁴

From 1990 to 1992, a more transparent and simplified tariff schedule was adopted, providing for a phased reduction in import tariffs, while the main non-tariff barriers to trade were removed, including those related to agricultural commodities and agricultural inputs. More specifically, the main landmarks of liberalization in Brazil's agricultural trade were (OECD, 2005): abolition of export licensing, in 1987; the elimination of quantitative restrictions on exports of soybeans, soybean oil and meal, maize and cotton, in 1989; the end of the state monopoly on wheat marketing and trade, in 1990. Later in that decade (1995), both the disciplines established by the Uruguay Round Agreement on Agriculture on market access, export competition and domestic support, and the Mercosur Customs Union came into force, with free-trade within the common market area prevailing for about half of Brazil's agro-food imports. In 1995, sugar export controls were discontinued; in 1996 the Kandir Law exempted raw materials and "semi-industrialized" exports from Imposto sobre Circulação de Mercadorias e Prestação de Serviços (ICMS) taxes, which benefited agriculture directly; and in 1997-1999 the state monopoly on ethanol trade was eliminated.

Those reforms had a beneficial impact on productivity, with yields increasing significantly in the 1990s (table 23). As expected, yields of importable crops increased more than those of exportables, for which yields were already relatively high. From 1990 to 2000, cotton yields increased 148%, as production moved to the Center West, making Brazil a net exporter of this product in 2001. For wheat yields went up 36%. The impact of reform on exportables was more modest, the major exception being soybeans. In this case the adoption of new technologies in the Center West boosted yields by 39% between 1990 and 2000, before falling again in the following half decade. In turn, total agricultural area remained more or less constant in the 1990s, as increases in the Center West were offset by reductions in the South and Southeast, increasing more markedly in this decade, essentially on account of a large expansion in the area planted with soybeans and, less remarkably, sugar cane. While in agriculture it was the rise in yields, rather than an expansion of agricultural area, that underpinned output growth, in the case of livestock productivity (weight per

23. The good performance of agriculture was, in turn, important to strengthen the reform process. Deregulation and import liberalization led initially to the substitution of imports for domestically produced importables, but soon Brazil became competitive in these crops. Since then, some formerly importing crops, such as maize and cotton, have become net exporters. With rising exports and only a minor increase in imports of agricultural products, from US\$ 2.3 billion in 1990 to US\$ 3.6 billion in 2004, the contribution of agriculture to Brazil's trade surplus went from US\$ 6.5 billion in 1990 to US\$ 23.6 billion in 2004.

24. Although having reserved its right to subsidize agricultural exports under the Uruguay Round Agreement on Agriculture, the Brazilian government has never resorted to that prerogative.

animal) rose more modestly, and the increase in output stemmed mostly from the expansion in the number of animals slaughtered.

TABLE 23

Area, production and yields for crops and production and productivity for livestock

Item	Element	Unit	1990	2000	2005
Crops					
Citrus fruit	Area harvested	1000 ha	1,001	972	930
	Yield	m/ha	18.5	23.5	21.6
	Production	1000 m	18,543	22,876	20,142
Coffee, green	Area harvested	1000 ha	2,909	2,268	2,326
	Yield	hg/ha	0.50	0.84	0.94
	Production	1000 m	1,465	1,904	2,179
Maize	Area harvested	1000 ha	11,394	11,615	11,469
	Yield	hg/ha	1.87	2.74	3.04
	Production	1000 m	21,348	31,879	34,860
Soybeans	Area harvested	1000 ha	11,487	13,640	22,895
	Yield	hg/ha	1.73	2.40	2.19
	Production	1000 m	19,898	32,735	50,195
Sugar cane	Area harvested	1000 ha	4,273	4,846	5,767
	Yield	hg/ha	61.5	67.6	72.8
	Production	1000 m	262,674	327,705	420,121
Tobacco leaves	Area harvested	1000 ha	274	310	493
	Yield	hg/ha	1.63	1.87	1.78
	Production	1000 m	445	578	879
Seed cotton	Area harvested	1000 ha	1,904	802	1,254
	Yield	hg/ha	1.01	2.51	2.97
	Production	1000 m	1,921	2,010	3,727
Wheat	Area harvested	1000 ha	2,681	1,066	2,374
	Yield	hg/ha	1.15	1.56	2.19
	Production	1000 m	3,094	1,662	5,201
Livestock					
Beef and veal	Slaughtered/prod. animals	Million animals	22.5	31.1	36.5
	Carcass Wt/yield	kg/animal	183	211	213
	Production	1000 m	4,115	6,579	7,774
Pigmeat	Slaughtered/prod. animals	million animals	12.5	35.7	38.4
	Carcass Wt/yield	kg/animal	84	73	81
	Production	1000 m	1,050	2,600	3,110
Poultry meat	Slaughtered/prod. animals	Million animals	1,769	4,244	5,300
	Carcass Wt/yield	kg/animal	1.37	1.44	1.68
	Production	1000 m	2,422	6,125	8,895

Source: FAOSTAT data, 2006.

Overall, both labor and land productivity went up substantially in the 1990s, while capital productivity rose more slowly, so that the sharp improvement in yields overstates gains in total factor productivity (TFP). Although we do not have separate estimates for the 1990s, the results in table 24 make clear that TFP has increased much faster in recent years than during the import substitution period. Thus, while in 1961-1981 TFP growth in Brazilian agriculture was only a fraction of that observed in Argentina and Latin America as a whole, this situation was reversed in 1981-2001.

TABLE 24
Changes in agricultural TFP in various regions and countries—1961-2001
 (%)

Country/region	Crops		Livestock		Aggregate	
	1961-1981	1981-2001	1961-1981	1981-2001	1961-1981	1981-2001
Brazil	0.38	3.00	0.71	3.61	0.49	3.22
Argentina	3.08	3.93	0.90	0.43	1.83	2.35
Uruguay	1.29	2.02	-0.32	0.53	0.01	0.87
Latin America and Caribbean	1.45	2.26	1.39	2.13	1.36	2.24
Asia and Middle East	1.71	2.02	2.20	3.45	1.92	2.50
Africa	1.03	1.74	1.49	1.09	1.20	1.68

Source: Ávila and Evenson (2005).

The timing of the upsurge in agricultural productivity and output highlight the effect of market-oriented reforms. As in manufacturing, trade liberalization forced producers of importables and those in formerly regulated markets (notably wheat, milk, sugar and coffee) to compete. Moreover, in the 1990s there was a scaling down of expenditures on price support and subsidized credit, which also forced producers to become more productive, facilitating new entries and expelling inefficient farmers. Trade liberalization also reduced input prices (especially machinery) at a faster pace than output prices were falling, helping to sustain profitability. Yields improved thanks also to agricultural research tailored to climatic conditions in the Center West. In this regard, Mendonça de Barros and Mendonça de Barros (2005) highlight the role of knowledge generation, largely under the aegis of Embrapa, a state-owned research company, for the success of building a competitive agriculture. A number of other factors also contributed to raise agricultural productivity: the substitution of more productive land in new areas for less productive one in traditional areas (linked to the development of new technology), causing an increase in the average size of farm operations, with farmers reaping greater gains from economies of scale; greater fertilizer consumption, which more than doubled between 1990 and 2000 (when planted area remained constant) and price stabilization, with the Real Plan, launched in 1994, which helped to establish a more stable investment climate.

The contribution of Embrapa-developed technology, as well as that of earlier investments in infrastructure (1970s and 1980s), highlight the public sector's role in fostering the competitiveness of Brazil's agriculture. Also important was its contribution to the accumulation of human capital, through the public university

system, from which a large number of professionals graduated in agricultural and forestry engineering, veterinary, and zootecny. Moreover, as noted by Mendonça de Barros and Mendonça de Barros (2005), between 1970 and 1985 the sector was a net recipient of resources from the rest of the economy, through subsidized credit programs, encouraging the use of fertilizers, machinery and equipment.

The OECD (2005) estimates that total public support to agriculture averaged 0.5% of GDP per year in 2002-2004, a figure that, as shown in table 25, is well below the observed rates in most OECD countries, and roughly comparable to Australia (0.3%) and New Zealand (0.4%). Three-quarters of this total correspond to support given directly to farmers, while general services delivered to the sector (research and extension, training, and the development of rural infrastructure) account for the rest (table 26). Agricultural research, extension and education together comprise one half of the overall spending on general services. Expenditures with general services have lost importance in recent years, raising concerns about the sustained performance of research programs.

TABLE 25
Estimated support to agriculture: selected countries—2002-2004

	Producer support estimate (% of gross farm receipts)	Total support estimate (% of GDP)
New Zealand	2	0,4
Brazil	3	0,5
Australia	4	0,3
Russia	5	0,6
China	8	3,6
United States	17	0,9
Mexico	21	1,2
Canada	22	0,8
OECD	30	1,2
European Union	34	1,2
Japan	58	1,4

Source: OECD (2005).

Although in the past farmers have benefited from larger resource transfers, since the mid-1990s these have become relatively small for international standards. According to OECD (2005), producer support in Brazil accounted for 3% of the gross value of farm receipts in 2003-2004—at par with New Zealand (2%) and Australia (4%), and far less than the OECD average rate (30%) and their corresponding figures in the United States (17%), the EU (34%) and Japan (58%). Import competing staples (wheat, maize and rice) and cotton receive the highest levels of support, with rates ranging from 6% to 17%.

TABLE 26

Total support to Brazilian agriculture

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004p	Average 2000-2004
Total support estimate (R\$ million)	1,855	3,660	4,093	7,726	3,959	5,962	6,109	6,930	9,172	8,522	8,208
Producer support estimate	-615	630	401	4,157	1,106	3,665	2,748	4,285	7,013	5,952	5,750
General service support	2,470	3,026	3,650	3,500	2,845	2,240	3,232	2,622	2,159	2,537	2,439
Transfers to consumers from taxpayers	0	4	42	69	8	57	129	23	0	33	19
Total support estimate in											
Million US\$	2,021	3,641	3,795	6,654	2,180	3,259	2,597	2,364	2,986	2,913	2,754
Share of GDP (%)	0,3	0,5	0,5	0,8	0,4	0,5	0,5	0,5	0,6	0,5	0,5

Source: OECD (2005).

Public support to farmers includes price support and stabilization mechanisms, as well as credit at preferential conditions, to finance production, investment, and marketing (table 27). The focus has traditionally been, and remains, on financing farmers at special terms, until recently directly by public banks.²⁵ In particular, legislation mandates banks and other financial institutions to assign 25% of their demand deposits for rural credit operations, at pre-established conditions.²⁶ Support is granted through government-controlled interest rates and through equalization schemes, when credit is provided by the private sector. Financial institutions may also voluntarily finance farmers, at market conditions.

TABLE 27

Main agricultural support measures and programmes

Programme	Description
Rural credit	Financing of agricultural activities at rates controlled and fixed by the government
BNDES/Finame credit line	Credit for acquisition and maintenance of machinery and equipment, irrigation systems and refrigeration equipment, and cattle raising
Special BNDES credit lines	Financing of specific agricultural activities at preferential conditions
Programme to Strengthen Family Farming—Programa Nacional de Fortalecimento da Agricultura Familiar (Pronaf)	Support for family farming, artisan fisheries, aquaculture, livestock, and extraction of rubber in the Amazon region
Policy of Guaranteed Minimum Prices—Política de Garantia de Preços Mínimos (PGPM)	Price support mechanism
Option contracts	Price stabilization mechanism
Premium for Product Outflow—Prêmio para Escoamento de Produto (PEP)	Guaranteed reference prices

Source: WTO (2004).

25. Up to the mid 1980s, official credit covered practically all the financing needs of the agriculture sector. That changed in the mid 1990s, being substituted by a strategy based on the securitization of agricultural debt and greater emphasis on private financing, but only after agricultural debt was refinanced, at preferential conditions, to reduce farmers' risk as borrowers.

26. Credits funded by these so-called "mandatory resources" schemes are granted at an effective annual interest rate of 8.75% (WTO, 2004).

Since the mid-1990s, greater emphasis has been given to attract private finance to the sector, although the public sector continues to play a central role.²⁷ In addition to intermediating rural savings funds through the Banco do Brasil (BB), Banco da Amazônia, Banco do Nordeste (BNB), to which the special provisions apply, the public sector created in the BNDES two general credit lines for investment in the agriculture sector (WTO, 2004): the BNDES/Finame Special Agricultural Credit, which finances the acquisition and maintenance of machinery and equipment, as well as irrigation systems and refrigeration equipment; and the BNDES Automatic, which grants credit for cattle raising. There are eight specific BNDES programmes for agriculture (table 28). Although they generally follow the terms granted for general credit, the scope and conditions of these programmes vary, but they are all “concessional”. Commercial agribusinesses are also typically financed directly by clients (such as soybeans crushers or orange juice producers) and suppliers (such as fertilizer).

TABLE 28
Agricultural credit programmes administered by the BNDES—early 2004

Programme	Description	Financial conditions
Tractor Fleet Modernization Incentives Programme—Programa de Modernização da Frota de Tratores Agrícolas e Implementos Associados e Colheitadeiras (Moderfrota)	Finances the acquisition of tractors	Credits for up to 100% of the value of purchases and interest rate of 9.75% for farmers with gross annual agricultural revenue less than R\$ 150,000; and up to 80% and interest rate of 12.75% for income above that threshold. Duration of 5 years. Coffee farmers can receive credits of up to R\$ 20,000 if annual income is below R\$ 60,000
Incentives Programme for Irrigation and Storage—Programa de Incentivo à Irrigação e à Armazenagem (Moderinfra)	Finances irrigation and storage projects of up to R\$ 400,000 per beneficiary, independently from other rural credits	Interest rate: 8.75%. Repayment period: 8 years
Cooperative Development Programme for the Enhancement of Agricultural Value Added—Programa de Desenvolvimento Cooperativo para Agregação de Valor à Produção Agropecuária (Prodecoop)	Aimed at promoting efficiency gains in cooperatives by financing studies, projects, works, installation, machinery and equipment and working capital for up to R\$ 20 million per cooperative	70%, 80% or 90% of the project value is financed depending on turnover. Interest rate: 10.75%. Repayment period: 12 years, include three of grace
Programme for the Modernization of Agriculture and the Conservation of Natural Resources—Programa de Modernização da Agricultura e Conservação de Recursos Naturais (Moderagro)	Provides credit for soil and pastures conservation and recuperation for up to R\$ 200,000 per producer	Annual interest rate: 8.75%, including remuneration to financial institution of 3%. Repayment period: 60 months, including a 24 month grace period. No interest paid during grace period
Agribusiness Development Programme—Programa de Desenvolvimento do Agronegócio (Prodeagro)	Credits for floriculture, apiculture, aquaculture and similar activities, aimed at quality improvements; the limit is R\$ 150,000	Annual interest rate: 8.75%, including remuneration to financial institution of 3%. Repayment period: 60 months, including a 24 months grace period. No interest paid during grace period

(cont.)

27. As discussed in detail in WTO (2004), there are several different sources for the rural credit, in addition to voluntary credits extended by financial institutions, suppliers and clients (e.g., crushers): 25% of banks' demand deposits, rural savings, the Workers Support Fund—Fundo de Amparo ao Trabalhador (FAT)— and the BNDES. For funds stemming from rural savings, the FAT and the BNDES, the equalization principle may be applied, covering the difference between market interest rates and those for granting the credit, the latter used by small farmers.

(cont.)

Programme	Description	Financial conditions
Fruit Industry Development Programme— Programa de Desenvolvimento da Fruticultura (Prodefruta)	Credit to promote the efficiency in the fruit industry for up to 100% of financing needs, up to R\$ 200,000 per beneficiary	Annual interest rate: 8.75%, including remuneration to financial institution of 5%. Repayment period: 96 months, including a 36 months grace period. No interest paid during grace period
Milk Production Mechanization and Transportation Incentive Programme— Programa de Incentivo à Pecuária Leiteira (Proleite)	Grants credits for milk storage installation and related purposes of up to R\$ 80,000 per producer	Annual interest rate: 8.75%, including remuneration to financial institution of 3%. Repayment period: 60 months, including a 24 months grace period
Programme of Commercial Planting and Recovery Forest—Programa de Plantio Comercial e Recuperação de Florestas (Propflora)	Aimed at fostering tree planting and grants credits for up to 35% of the value of a project, with a limit of R\$ 150,000 per beneficiary	Annual interest rate: 8.75%, including remuneration to financial institution of 3%. Repayment period: 12 years, including and up to 96 months grace period. No interest paid during grace period

Source: WTO (2004).

There are no specific export credit programs for agriculture, but agro-food exporters can resort to three general programs, discussed in more detail in section 5: *a)* Export Financing Program; *b)* BNDES-Exim credit; and *c)* Export Guarantee Fund—Fundo de Garantia à Exportação (FGE). The BB finances the exporter (supplier credit) or directly the importer (buyer credit) under the Programa de Financiamento às Exportações (Proex) scheme. In the case of agriculture, the maximum maturity is six months (flowers, fruit, fruit and vegetable preparations, meat preparations, cigars, and some beverages and spirits), and the minimum is two months (vegetables, tea, spices, cereals, peanuts, among others), and up to 100% of the export value can be financed. Interest rates are based on international market levels (LIBOR as a minimum). BNDES-Exim credit is offered by the BNDES and applies to a wide range of goods and services, including agricultural products.

Of late, the competitiveness of Brazilian agriculture has also benefited from positive shocks, including the 1999 exchange rate devaluation, the pick up in world economic growth since 2003, the rising demand for food products from low income countries, notably China, and the outbreak of foot-and-mouth disease (gradually eliminated in most Brazilian states) and Bovine Spongiform Encephalitis (BSE) in Europe, the United States and Canada. According to the OECD (2005), much of the recent boom is attributable to this combination of a short-term positive shocks and a depreciated exchange rate.

4.3 BRAZIL'S EXPORT OUTLOOK

Can we extrapolate the remarkable performance of Brazil's agriculture exports in 1991-2005 into the future? The answer is yes, conditioned on the expansion in transport infrastructure and the success of multilateral negotiations in lowering subsidies and barriers to free world agricultural trade. There are several reasons for our guarded optimism:²⁸

28. For further discussion of these strengths, see Mendonça de Barros and Mendonça de Barros (2005).

- Rapid economic growth in China and India should rescue hundreds of millions people out of poverty, boosting the demand for food; therefore, the demand for agricultural products should stay strong for some time yet.

- Brazil's agricultural area is exceeded only by China, Australia and the United States, and it still counts with a relative abundance of low-cost land. Different estimates point to the existence of more than 100 million hectares of arable land in the Cerrados area alone. Moreover, there are between 170 to 180 million hectares used for low productivity pastures that could be converted into arable cropland (table 29).²⁹

- Brazil has favorable conditions of soil, temperature, access to water and lightening in different regions of the country. In particular, with the new planting methods being adopted, they allow farmers to harvest two crops in a single year. In addition, low weather risk, notably in the Center West, mitigates the consequences of a poorly functioning insurance system.

- Continued support to research and development activities should guarantee that productivity keeps rising in agriculture. Indeed, as shown in table 30, there is still room for some catching up with respect to best practice in agricultural productivity for all main Brazil's exports.

- Farmers have also integrated well crop plantation and cattle raising activities, with Brazil benefiting from being a large producer in both segments.

- Expansion of agriculture to the Center West and other Cerrado savanna areas in the Northeast have fostered large scale production, generating economies of scale and higher productivity.

- Brazil has invested heavily in human capital, with the establishment of several courses in agriculture engineering, forestry, zootecny, and biology in good universities. These should assure the supply of well-educated professionals for the sector.

- With temperate and tropical regions, and the technological expertise to produce under both types of climate, Brazil has diversified its agricultural product mix and export basket, reducing the risk of downturn in either of them.

- Brazilian agribusiness has used the windfall gains of recent years to sophisticate its activities intensifying the use of information systems and international connections, with the emergence of highly sophisticated operators, in agriculture itself and in down and upstream activities.

29. Brandão, Rezende and Marques (2005) estimates that 80% of the increase in the area cultivated with crops in the last ten years stemmed from land previously used as pasture.

TABLE 29
Land use patterns–2003

	Total area	Land area	Agricultural area	Arable and permanent crops	Arable land	Permanent crops	Permanent pasture
Brazil	851,5	845,9	263,6	66,6	59,0	7,6	197,0
Argentina	278,0	273,7	128,7	28,9	27,9	1,0	99,8
Australia	774,1	768,2	439,5	47,9	47,6	0,3	391,6
China	959,8	932,7	554,9	154,9	142,6	12,2	400,0
India	328,7	297,3	180,8	169,7	160,5	9,2	11,1
United States of America	962,9	915,9	409,3	175,5	173,5	2,1	233,8
Memo							
Brazil 1990	851,5	845,9	241,6	57,4	50,7	6,7	184,2

Source: FAOSTAT data, 2006.

TABLE 30
Compared productivity indicators for main crops and livestock production–2005

	Argentina	Australia	Brazil	United States of America
Crops (m/ha)				
Citrus fruit	18.6	22.8	21.6	26.0
Coffee, green			0.94	1.06
Maize	7.1	4.2	3.0	9.3
Seed cotton	1.2	4.1	3.0	2.3
Soybeans	2.7	2.9	2.2	2.9
Sugar cane	63.3	91.1	72.8	66.6
Tobacco leaves	1.8	2.0	1.8	2.3
Livestock (carcass Wt/yield)				
Beef and veal (kg/animal)	210	244	213	332
Pigmeat (kg/animal)	75	73	81	90
Poultry meat (kg/animal)	2.3	1.7	1.7	2.0

Source: FAOSTAT data, 2006.

There are, on the other hand, reasons for concern about the long-term sustainability of Brazil's exceptional agricultural export growth. For one, productivity gains and the lowering costs of inputs stemming from trade liberalization and sector reforms, which fostered the reallocation of resources to agriculture, and within it to the sub-sectors in which Brazil has greater comparative advantage, are partly once and for all, so it might be unrealistic to simply extrapolate them into the future. Moreover, the more recent export rally (2000-2005) owes much to positive shocks, such as a weak currency, low interest rates and plenty of liquidity in OECD countries, and the booming world economy. Already in 2005 these effects had started to falter: the exchange rate appreciated, the G7 has tightened monetary policy and the prices of some foodstuffs have slipped back from previous peaks. As these more transitory factors lose importance, the competitiveness of Brazil's agriculture will

become more dependent on structural factors, some of which remain unfavorable, from infrastructure bottlenecks to trade barriers. Domestically, some of the weaknesses are:

- A poor transportation and warehousing infrastructure. Because producers in Brazil are typically a long distance from their main markets, and a relatively large share of the country's agro-food exports tends to be in the form of bulk commodities, transport costs are important for Brazilian exporters, making the deficiencies of the internal logistics system an important drag on their competitiveness. Lack of transport infrastructure is also a major hindrance to expanding agricultural area. As the agricultural frontier goes deeper into Brazil's interior, the poorly developed road network—only 10% of the roads are paved—becomes a key determinant of agricultural growth. In particular, this dearth of infrastructure may constrain the rapid conversion of permanent pasture into crop land.

- Environmental restrictions. This will gain importance as the agricultural frontier moves into the Amazon region, notably because livestock farmers dislodged by the conversion of pasture to crop land tend to move further into Brazil's inlands, threatening the Amazon rainforest.

- Sanitary risk, which will tend to rise as the volume of production expands. Public investment in supervision, control etc. has to rise compatibly with the expanded scale of output, but recent outbreaks of foot and mouth disease suggest that this has not always been the case. If tariffs and quotas are reduced as part of trade negotiations, it is likely that phyto-sanitary barriers gain importance.

- The high cost and low availability of capital, which limits capital deepening and dampens productivity growth. Commercial agribusiness are less constrained in this regard, for they tend to be financed by clients and suppliers; exporters, in particular, who are paid in hard currency, have another lever to reduce their cost of credit, but producers obliged to borrow on the domestic market are especially penalized, despite government subsidies

- The considerable scope for poorer Brazilians to consume more foodstuffs, notably products with relatively high income elasticities (such as meat and fruit and vegetables), which will reduce the attractiveness of export markets.

Access to the markets of its trade partners is, though, by far, the most critical barrier to the sustained growth of Brazil's agricultural exports. Brazilian exporters face a range of difficulties in gaining access to foreign agricultural markets, especially among OECD countries. They are impeded by high tariffs in key markets, tariff escalation according to the degree of processing for several important commodities, unfavorable treatment under trade preference schemes and tariff-rate quota (TRQ) systems, and significant non-tariff measures (notably for livestock products). Jank (2003); and Jank, Fuchsloch and Kutas (2002) show that Brazilian agriculture products face the highest average tariff (over 30%) among the participants of a would-be Free Trade Area of the Americas (FTAA), and thus have much to gain from agricultural trade liberalization. Annex briefly describes the protection schemes faced by Brazilian farmers for each of its main agricultural exports, which are analyzed in detail by OECD (2005). The main barriers include:

- High tariffs in key markets, notably for sugar, poultry, orange juice, beef, pork, and tobacco.
- Tariff escalation according to the degree of processing, which are especially detrimental in the soybean sector and for processed food products and coffee.
- Discriminatory import regimes, such as country-specific TRQ allocations, and preference schemes, which typically are unfavorable to Brazil. These mechanisms are relatively important in the sugar, beef and cotton sectors and are applied most by the countries that represent Brazil's biggest overall markets: the EU, the United States, China and Russia.
- Non-tariff measures, such as sanitary and phyto-sanitary regulations, which are a particularly relevant barrier for meat products.

As they stand, high agricultural tariffs and non-tariff barriers in most countries, and subsidized production and exports by rival suppliers in rich countries, heavily discriminate against Brazil and impede it from fully exploiting its comparative advantage in agriculture. As discussed above, the expansion recorded in the last 15 years depended much on the geographical diversification of export markets, but this alternative has a limited further potential, perhaps with the exception of the Chinese markets. Therefore, among the areas in which an agreement on reforms is being pursued, market access is paramount for Brazil, and the country has actively sought in WTO negotiations to liberalize agricultural trade, as well as fought against production and export subsidies by rich countries within the WTO dispute resolution framework. In both multilateral and regional trade negotiations, market access to agricultural products has been a central goal of Brazil's policy makers (RIOS; IGLESIAS, 2005; JANK; TACHINARDI, 2006).

Most simulation exercises show that Brazilian exporters stand to gain substantially from a new round of multilateral trade liberalization that reduces the aforementioned market access restrictions. The OECD (2005) estimates that cutting tariffs and exports subsidies in half, in all countries and sectors, and reducing domestic support to agriculture in OECD countries, Brazil and China by 50%, would provide a welfare gain to Brazil of about 0.3% of GDP. Agricultural trade reform is particularly important to Brazil, accounting for two-thirds of the country's total welfare gains. In particular, 59% of Brazil's welfare gains would come from tariff reductions on agricultural products by OECD members. The sectors benefiting most from these reforms would be beef, non-ruminant meats, oilseeds and other crops (including coffee, cotton and tobacco), as well as the processed food sector. The sugar industry would benefit relatively less, as the OECD's model estimates only modest changes in world sugar prices. Fabiosa et al. (2002) also estimate that agricultural market liberalization, as proposed in the Doha Development Agenda, would cause Brazil to greatly expand output, partly as a result of substantial price increases in meat and dairy products. The same study estimates that soy bean prices would go up by 3.1% and Brazilian soybean oil exports would increase 11%. The

gains to Brazil from agricultural policy reforms in OECD countries account for more than half of all gains to developing countries.³⁰

In the absence of sweeping reforms in world agricultural trade, Brazilian agriculture export growth should lose steam. According to the latest OECD-FAO Agricultural Outlook, world market prices for most agricultural products should decline in real terms, for growth in supply (largely productivity gains) should outstrip the rise in demand. The Outlook foresees a somewhat favorable scenario for Brazilian producers due to a weakening of the real against the dollar and GDP growth of around 4% per year, which would boost domestic demand. In this scenario, output would continue to expand, but less rapidly than in the last decade, also on account of infrastructural bottlenecks. The net result of this expansion in supply and demand would be a slowing down of export growth for most products (table 31). Yet, the Outlook foresees that Brazil would continue to gain importance as an agricultural trader:

Strong demand for oilseeds in traditional importing countries is projected to lead to an expansion in the global oilseed market with exports from Brazil virtually dominating the expanding marketplace. As a result, Brazil may even surpass the US as the world's leading oilseed exporter over the projection period. In addition, Brazil features as a large player within the Latin American region for exports of soybean oil. Despite expectations of continuing low world sugar prices, Brazil is expected to remain the world's largest sugar exporter, with combined sales of both raw and white sugar projected to increase by nearly 44% over the next ten years. In addition, Brazil is expected to become the world's largest beef exporter over the same period. Likewise, additional supplies needed for a growing global market for pork are expected to be met by Brazil expanding its investment in the sector. Similarly, Brazil is positioned to further expand poultry production and to maintain its role as the largest exporter of poultry meat. Finally, Brazil belongs to the group of countries that are expected to increase their share of global milk production over the coming decade and this is reflected in changes in dairy product trade.

TABLE 31
FAO/OECD's projections for Brazil's agricultural commodity net trade
 (% growth)

Commodity		1993-2003	2004-2014
Soybeans	m	15.2	4.0
Soybean meat	m	3.8	2.2
Soybean oil	m	16.6	2.3
Maize	m	-9.4	1.3
Wheat	m	-1.0	5.0
Rice	m	7.1	-0.9
Sugar	m rse	14.0	8.2
Beef	m cwe	12.0	1.5
Pigmeat	m cwe	25.6	3.1
Poultry	m cwe	15.5	1.7

Source: OECD-FAO (2005) *apud* OECD (2005).

30. These are results from a comparative static exercise based on data for 2001. This kind of simulation tends to produce comparatively small gains from trade liberalization, vis-à-vis those obtained when dynamic factors are considered. Moreover, the expansion of Brazil's agricultural exports since 2001 suggests that actual welfare gains should currently be larger than those estimated in this exercise.

5 ECONOMIC POLICY, TRADE POLICIES AND EXPORT PROMOTION

For six decades, from the Great Depression of the early 1930s to the late 1980s, economic policy in Brazil was characterized by low integration into the world economy, pervasive discretionary state intervention, and the prevalence of planning and command over market competition. The emphasis was on fostering investment to “occupy empty spaces” expanding domestic production to substitute for imports, rather than on efficiency, favoring profits even if at the expense of consumer welfare, with inflationary financing providing a good part of government’s revenues most of the time. This picture changed substantially in the late 1980s-early 1990s, as economic reforms were implemented. This section first reviews how one of these reforms, trade liberalization, was carried out, due to its critical role in generating productivity gains and, thus, on fostering exports; and then discusses the current features of Brazil’s trade policy more directly linked to export promotion.

5.1 TRADE POLICIES AND TRADE LIBERALIZATION³¹

Brazilian producers historically benefited from a host of import barriers, the most important of which were high tariff and non-tariff protection, foreign exchange controls, and, at times, undervalued exchange rates. Imports of so-called non-essential goods were severely penalized. Non-tariff barriers were widely used. Redundant tariffs were the norm. Forty-two special import regimes allowed for the exemption or partial reduction of import duties (see KUME; PIANI; BRÁZ DE SOUZA, 2003). The lack of competitive pressures from imports hampered productivity, particularly in manufacturing, and the pressure for greater efficiency and lower prices of non-tradables. Complacency with the low quality of infrastructure and no availability of modern services (in telecommunications, for instance) were a natural result of these developments. The high cost of essential imports or of their domestic substitutes, in turn, penalized exports. Low domestic and external competitiveness and an anti-export bias were the obvious results.

Starting in 1988, Brazil liberalized import policies to foster allocative efficiency via external competition. Three rounds of tariff reductions took place: in 1988-1989, 1991-1993 and 1994 (KUME; PIANI; BRÁZ DE SOUZA, 2003). In 1988-1989, the average tariff on imports came down from 51% to 35%. Because it focused essentially on reducing tariff redundancies, this round of trade liberalization faced little opposition. The second round, begun in 1990, was comparatively much more radical, having had, by far, the deepest and most lasting effects on the economy. According to its original schedule, shown in table 32, the median tariff was to fall from 30% to 10%, with the maximum tariff declining from 105% to 20%. Zero nominal protection was to be given to goods in which Brazil had a clear comparative advantage, faced high transport costs or had no domestic substitutes. At the high end of protection would be high-value added goods, such as durable consumer items (HORTA; PIANI; KUME, 1991). Also in 1990, non-tariff barriers not supported by specific laws were eliminated; requirements of floor values for import financing were

31. This sub-section draws on Pinheiro, Bonelli and Schneider (2004).

gradually abolished; minimum domestic content indices for financing equipment purchases were reduced; and administrative procedures were abolished or simplified.

TABLE 32

Brazil import liberalization: original schedule for reducing import tariffs–1990-1995

(%)

Dates	Mean	Mode	Median	Range	Standard deviation
1990	32.2	40	30	0 – 105	19.6
February 1991	25.3	20	25	0 – 85	17.4
January 1992	21.2	20	20	0 – 65	14.2
October 1992	16.5	20	20	0 – 55	10.7
July 1993	14.9	20	20	0 – 40	8.2
January 1995	12.1	14	10	0 – 20	6.1

Source: Pinheiro (1996).

Underlying the option for gradual tariff reductions was the concern to raise public support for the liberalization program. Thus, the way the tariff reduction schedule was organized was supposed to gradually increase access to imported consumer goods, without pushing the trade balance into a deficit or swamping domestic markets with imports, which would quickly stimulate resistance to trade liberalization from domestic producers. Moreover, imports of industrial inputs and capital goods were liberalized first, to allow domestic producers to become more competitive before foreign competition increased in the final stages of the process. By then, it would be important to have a clear perception of advantages stemming from liberalization, to guarantee support to the program's continuity (KUME; PIANI; BRÁZ DE SOUZA, 2003, *passim*).

The 1990 schedule was modified several times, mostly in order to anticipate tariff cuts. This happened, for instance, in 1992 and just after the Real Plan was implemented, in late 1994. In 1992, when it became likely that President Collor would be impeached, the outgoing government decided to speed up the process, to preempt pressures for a suspension of the original schedule by the less liberal President Franco's government. At the end of 1994 import tariffs were reduced to check domestic price increases, when doubts about the sustainability of the new stabilization plan were high and producers threatened to raise prices. An opposite trend was observed after 1994, when tariffs were increased on a number of consumer goods, some of which had had tariff reductions only a few months before, reflecting the pressure from interest groups and the concern with rising trade deficits. In November 1997, authorities raised tariffs in 3 p.p. as a reaction to increasing current account deficits and the shortage of external finance after the Asian crisis. Meanwhile, from 1995 onwards tariffs on a selected set of food products, chemicals, textiles and metallurgical products were reduced, to check (so-called abusive) price increases. The pragmatic, flexible character of trade liberalization was clear in this selective tinkering with tariffs, which also encompassed frequent alterations of import duties of goods in the common external tariff's (CET) "exception list", so as to keep duties on certain

products well above those accorded among Mercosur partners (BAUMANN; RIVERO; ZAVATTIERO, 1997).

Despite these ups and downs, liberalization of trade was substantial. Average tariffs were initially reduced from 57.5% in 1987 to 30.5% in 1990 (table 33). In 1987, they ranged from 15.6% to 102.7%. By 1990, a substantial narrowing had occurred, with tariffs ranging from 3.3% to (a still very high) 78.7%. Reductions continued up to 1994, when the average was 11.2%, and the interval ranged from 0% to 23.5%. With the reluctance to devalue, tariffs were again raised in President Cardoso's first term: by 1998 the average tariff had returned to 15.5%, the same level reached 6 years before, when liberalization was still under way.

TABLE 33
Descriptive statistics for sector nominal tariffs: selected years
 (%)

	1987	1990	1991	1992	1993	1994	1995	1998
Simple average	57.5	30.5	23.6	15.7	13.5	11.2	12.8	15.5
Weighted average ^a	54.9	27.2	20.9	14.1	12.5	10.2	10.8	13.4
Standard deviation	21.3	14.9	12.7	8.2	6.7	5.9	7.4	6.6
Maximum tariff	102.7	78.7	58.7	39.0	34.0	23.5	41.0	38.1
Minimum tariff	15.6	3.3	1.7	0.6	0.0	0.0	0.0	0.0

Source: Kume, Piani and Bráz de Souza (2003).

^a Weighted by value added.

Companies that had invested in Brazil as part of the import substitution process, notably those of foreign capital, and the associated labor unions, were the main opponents of trade liberalization in the early 1990s. These were sectors in which domestic competition was low or nonexistent, allowing for the extraction of rents that were partly shared with organized labor. Pressures from politically powerful sectors were accommodated selectively, increasing discrepancy, but not as much the average tariff. This reaction was facilitated by the flexibility given by Mercosur exception list. Ferreira and Facchini (2004) show that more concentrated sectors were able to obtain higher protection from imports, whereas more atomized sectors ended up with lower protection, revealing the sensitivity of trade liberalization to industrial lobbies. This sector differentiation is reflected on the structure of effective rates of protection (ERP). On average, the ERP reached in 1994 a fraction of its value in 1987, with a concomitant decline in discrepancy, before rising again in 1995-1998 (see next table). Effective protection on cars, trucks and buses also declined—from 351.0% in 1990 to 76.5% in 1993 and to only 27.7% in 1994—but after 1994 it increased significantly, to 129.2% in 1998, stressing the favorable protection awarded to the auto sector throughout. Even in the most unfavorable (to the industry) year (1994), effective protection on cars, trucks and buses was still twice the average of all sectors. In 1998 this ratio was around 6.5. Overall, the sector discrepancy in ERP is high.

TABLE 34

Descriptive statistics: effective rate of protection–sector data
(%)

	1987	1990	1991	1992	1993	1994	1995	1998
Simple average	77.1	47.7	34.8	20.3	16.7	13.6	17.1	20.2
Weighted average ^a	67.8	37.0	28.6	17.7	15.2	12.3	10.4	16.2
Standard deviation	53.8	60.6	36.5	17.2	13.5	8.4	19.5	21.3
Maximum ERP	308.1	351.1	198.3	93.5	76.5	27.7	113.8	129.2
Minimum ERP	8.3	-3.4	-4.0	-4.0	-5.0	-4.9	-2.4	-2.2

Source: Kume, Piani and Bráz de Souza (2003).

^a Weighted by value added.

As a result of reforms, Brazil has presently a much more market-oriented economy than before the 1990s. It is much more open to international trade and freer movement of capital, services, and technology. Exchange rate policy, in particular, evolved in two phases in the past decade. First, as auxiliary instrument of stabilization, exchange rate was allowed to appreciate (1994-1998). Trade policy in this period was largely conditioned by the use of the exchange rate as a nominal anchor to domestic process. Exchange rate appreciation was helped by very high interest rates, which were instrumental in curbing down inflation. Current account deficits accumulated, building quickly large external liabilities. Trade policy also benefited during this period from increasing integration within Mercosur and the institution of WTO. Overall, however, it can be said that trade policy was essentially passive during the initial years after stabilization. Second, as the regime became increasingly difficult to manage after the Asian and Russian crises, a new free-float exchange rate system was implemented (1999 to present). A competitive exchange rate, together with trade promotion measures, improved export prices, and strong growth of the world economy boosted export growth, product diversification, and penetration in new markets, as previously discussed. On the other hand, trade integration with traditional partners (i.e., Mercosur) lost importance, as well as incipient efforts at joining a Free Trade Agreement (FTA) and trade agreements with the EU, all presently at a standstill.³² So far, Brazil's integration efforts are concentrated on multilateral negotiations at the WTO.

5.2 TRADE POLICIES, FINANCING AND EXPORT PROMOTION: THE LAST DECADE

5.2.1 Introduction: general features

The first export incentives were established in Brazil still in the 1950s. With the intensification of the anti-export bias of the import substitution strategy, different exchange rate regimes were created to protect non-traditional exporters. In 1947-1953, these exporters could sell their hard currency proceeds directly to importers regularly listed in the BB's Import and Export Division (Cexim), which allowed

32. This is not the place to review the ups and downs of Brazil's attempts at improving its integration into new trade arrangements. A useful account is provided by Motta Veiga (2004).

them to obtain a more favorable exchange rate. In 1953, the exchange rate regime was reformed, with non-traditional exporters allowed to sell their hard currency at the “free market”, while buying at the official market. Later, this mechanism was replaced by system of hard currency auctions that also worked, in practice, as a multiple exchange rate regime, that also favored non-traditional exporters. This system of exchange rate premia survived until 1960, when, after a 40% devaluation, a single exchange rate substituted for the multiple exchange rate regime. However, the ensuing acceleration of inflation caused the exchange rate to appreciate and a year later non-traditional exporters were able to once more obtain an (informal) exchange rate premium in their hard currency sales.³³

The military government that came into power in 1964 discontinued the multiple exchange rate regime, while at the same time adopting a more coordinated export promotion program focused on industrial products, “to reduce the potential balance of payments deficit and assure the greater efficiency of industry, by allowing for economies of scale stemming from a larger volume of production” (MINISTÉRIO DO PLANEJAMENTO, 1964). A number of export incentives schemes were established in the following ten years.³⁴ In June 1964, the government implemented the drawback regime, whereby inputs used in the production of manufacture exports may be imported under exemption or total lifting of tariffs and other taxes normally due on imports, which had been legally established in 1957, but not put in practice before. Also in this year industrial exports were exempted from the Imposto sobre Produtos Industrializados (IPI) (federal valued added tax). From 1967, they were also exempted from the Imposto sobre Circulação de Mercadorias (ICM) (state valued added tax). In both cases, exporters were also given a fiscal credit corresponding to taxes paid on inputs used to produce exports. Also relevant was the establishment of a crawling-peg exchange rate regime that protected the profitability of exporters and greatly reduced exchange rate volatility. The focus then was, and remains to this day, manufacture exports, then only a minor fraction of Brazil’s total exports (figure 5).

In August 1964 the government created the first credit line to finance exporters’ working capital, the Fundo de Democratização do Capital de Giro (Fundece), which was later replaced by the Fundo de Financiamento à Exportação (Finex), established in 1996, which initially focused on exports of capital and consumer durable goods. In 1969 and 1970, respectively, the government established the IPI and the ICM fiscal credits, which gave manufacture exporters a tax credit correspondent to the taxes they would have to pay, were they not exempted from doing so. In 1971, exporters were exempted from income taxes on the profits derived from exports of industrial goods. In 1972, the Benefícios Fiscais e Programas Especiais de Exportação (Befiex) program was established, guaranteeing long term export incentives for new export projects and

33. By law, since the 1930s all export revenues have to be transformed domestically into local currency. The public monopolies in coffee and sugar exports facilitated this positive discrimination of non-traditional exporters.

34. A number of studies describe, quantify and discuss the relevance of the export incentives created in this period. See, in particular, Mendonça de Barros et al. (1975), Pastore et al. (1978), Musalem (1981), Baumann and Braga (1985), Baumann and Moreira (1986), and Braga and Tyler (1989).

extending tax exemptions to imports used by exporters in the production of domestically sold goods.³⁵

Export incentives were intensely used in the 1970s as a way to foster exports and attenuate the growing external deficit, in the absence of a needed exchange rate devaluation, which would only come in 1979. By then, under intense pressure from other General Agreement on Tariffs and Trade (GATT) members, the government started to reduce exports incentives. The incentives were equivalent in 1979 to 67.5% of the value of manufacture exports, falling to 45.1% in 1980, only to rise again to 76.7% in 1982 (BAUMANN, 1989). In the following years, though, some of these incentives, notably the IPI and the ICM fiscal credits and some of the credit subsidy lines, were discontinued, bringing the ratio of incentives to manufacture exports value to around 50%. In 1990, as part of the trade liberalization process, other export incentives were discontinued, including the Befiex program and the income tax exemption on profits stemming from export activities. On the other hand, value added tax exemptions and the drawback regime, which were consistent with the GATT rules, were maintained (PINHEIRO et al., 1993). In the following years, the government would also revamp the export financing schemes, with the creation of credit lines offered by the BNDES, in 1990, and the Proex, in 1991.

Export promotion has remained since then a key government concern. Already in 1992 initiatives in that regard were proposed under the Política Ativa de Comércio Exterior (Pace), seeking to lighten the bureaucratic burden faced by exporters, till the present a major hindrance according to exporters,³⁶ and fund the Proex. A number of ministries and public agencies participate in the design and implementation of Brazil's trade policy, from the establishment and enforcement of regulations to participation in trade negotiations. This has historically generated coordination problems and a lack of accountability. To mitigate these problems, the institutional apparatus was changed in 1995 with the creation of the Câmara de Comércio Exterior (Camex), an inter-ministerial committee directly under the Presidency of the Republic, the mandate of which is to coordinate the different federal agencies with a say in trade policy.³⁷ Camex's performance has been somewhat frustrating, on account of a lack of control of all the instruments needed to effectively act on trade policy.³⁸ Even so, it launched an ambitious program of export promotion in 1998–Programa Especial de Exportações (PEE)—with the objective of doubling exports in four years, until 2002. This objective proved impossible to attain in a context of

35. The Befiex was aimed at increasing exports of manufactured products and net foreign exchange earnings, through the exemption or reduction of import duties and of the IPI on imports of machinery, equipment and accessories, as well as of raw materials, intermediate products, and inputs. Imports were also exempt from the Adicional ao Frete para Renovação da Marinha Mercante (AFRMM). Befiex incentives were granted to firms that exported industrial goods, subject to export performance targets that determined the extent of fiscal benefits. Fiscal incentives granted over Befiex last decade of existence (1992-2002) totaled some US\$1.1 billion.

36. According to a survey carried out with exporters, the heavy bureaucratic burden is the one of the most important problem faced by exporters, second only to the intense competition in export markets (PINHEIRO; MARKWALD; VALS PEREIRA, 2002).

37. Carteira de Comércio Exterior (Cacex), the previous agency, had been extinguished in 1990. It had been responsible for administering a long series of initiatives aiming at rationing and directing foreign exchange resources to selected activities, as well as imposing tariff and non-tariff barriers.

38. For an appraisal of competitiveness policies in Brazil in the 1990s see Bonelli (2000).

semi-fixed exchange rate regime, but was fulfilled with the weaker exchange rate prevailing after 1999.

The public system of export financing has been reconstructed since the institutional void observed in the beginning of the 1990s. BNDES' traditional credit facilities under its subsidiary Finame were expanded to give way to an incipient export-import bank since the mid-1990s. At the same time, the Proex program was refurbished and the system of interest rate equalization renewed. These initiatives refunded the public system of export financing, which came to have: export credit mechanisms (pre- and post- shipment); credit instruments to finance importers of Brazilian goods (buyer's credit); mechanisms of interest rate equalization; and a system of export credit guarantees aimed at post-shipment operations (credit insurance) and pre-shipment (*Fundo de Aval*).³⁹

New initiatives have aimed at expanding the universe of exporting companies. Export promotion policies have given special emphasis to micro, small and medium companies through the following programs: *a*) the Guarantee Fund to Promote Competitiveness (FGPC) managed by BNDES and directed to guarantee loans extended via the BNDES System to boost the investments and exports of smaller companies; and *b*) the Export Promotion Agency (Apex). Apex's original goal was fostering exports of small firms, but its mandate was later expanded to include medium-sized and large companies as well.

In the early 2000s Brazilian trade policies registered minor changes with respect to the picture in the 1990s, notably regarding export promotion activities (CNI, 2003). After 2003, however, not much has changed, with trade policy centering almost exclusively around trade negotiations, which have barely moved in recent years (MOTTA VEIGA, 2005). The remaining of this section deals in some detail with the several instruments that have been used to foster export growth and diversification. Overall, initiatives in the last decade aimed at expanding and diversifying exports fell under three main headings: special tax regimes, favored finance and trade promotion, which are dealt with in more detail below. At the end of the section we describe selected trade-related aspects such as export prohibitions and restrictions, licensing, Export Processing Zones (EPZ), drawback mechanisms.

5.2.2 Taxation

All exports are exempt from the IPI and ICMS taxes, and complete indirect tax exemption has been a historical goal of export promotion policies. But the significant rise in Brazil's tax burden since the early 1990s has not left exports unscathed. Exports are also exempted from Contribuição para o Financiamento da Seguridade Social (Cofins), an increasingly relevant tax, but not from other cumulative taxes; in particular, the Contribuição Provisória sobre Movimentação ou Transmissão de Valores e de Créditos e Direitos de Natureza Financeira (CPMF) tax, charged on financial transactions in all steps of production and sales.⁴⁰ Moreover, in recent years

39. But the main sources of export finance are still the more traditional Adiantamento de Contratos de Câmbio (ACC)/Adiantamento de Contratos de Exportação (ACE) commercial credit lines provided by the banking system. See next.

40. The following subsections draw extendedly on WTO (2004).

exporters have been unsuccessful to cash in the tax credits originated by the payment of ICMS tax to which they are entitled according to the Kandir Law. The problem, in this case, has been a dispute between the federal and state governments concerning who should cover that cost.

Article 153 of the Constitution establishes that exports, with some exceptions (coffee, sugar, alcohol, and related products), are subject to a tax of 30%, which the Camex can reduce (to zero) or increase to up to 150%. However, of late, this tax was applied in only a few cases: tobacco exports to Paraguay and Uruguay, to prevent tax circumvention, and exports of cashew nuts (over a 10,000 ton quota), leather and hides. While the law allows for the application of an export tax of 30%, which can be decreased or increased (to up to 150%), in practice export taxes are all zero-rated (except those levied on certain products). Taxes are assessed on the FOB value or the price of the goods in the international market at the time of exportation. This price may not be lower than the cost of production augmented by taxes and other contributions and a mark-up of 15% on the sum of the costs and taxes.⁴¹ Brazil applies export tax to ensure domestic supply (in the cases where taxes are applied to all countries) and to control the regularity of commercial flows (when they are targeted to specific markets). But the use of export taxes is of marginal importance to the tax system and has decreased in the 2000-2004 period: export tax revenues amounted to only US\$ 32.2 million in 2001 and US\$ 26.6 million in 2002, representing a very small proportion of total exports.

5.2.3 Export finance, insurance, and guarantees

Brazilian exports are also entitled to two government credit-assistance facilities: *a*) the BNDES-Exim Program managed by the BNDES, which provides financing for production and foreign sale of manufactured goods; and *b*) the Proex managed by the BB.⁴² Export-credit insurance is also available to cover both the exporter and the financial institution involved in export financing against trade, political and unforeseen risks. This instrument is operated by Seguradora Brasileira de Crédito à Exportação S.A (SBCE), a partnership between BB, BNDES, Companhia Francesa de Seguro para o Comércio Exterior (Coface) and four Brazilian insurance companies.

Proex: A federal government program managed by the BB, Proex is an important source of funding for small and medium-sized companies involved in international trade. It was established in 1991, reviewed in 1999 and 2000,⁴³ and can be used to finance exports of goods, services, software, and cinematographic works,⁴⁴ also allowing exports to be grouped in a "package" containing ineligible goods with a value of up to 20% of the value of eligible goods. Its goal is to finance exports at

41. Minimum exports prices are not used, except as a base to calculate export taxes. For products that must be inscribed in the Registry of Sale, a fixed price may be used, but this price must be based in prevailing international market conditions.

42. Proex, one of the main tools for export promotion, was challenged in the WTO, and Brazil modified it twice recently as a result of recommendations.

43. Under Central Bank Resolution CMN 2,799 of 6 December 2000, to implement the determinations of the Dispute Settlement Body (DSB) panel Brazil-Export Financing Program for Aircraft (WT/DS46).

44. The list of goods that may benefit from the program is contained in Ministerial Act (*Portaria*) MDIC 58 of 10 April 2002.

conditions similar to those obtainable in international markets. The Proex, in its two modalities, supported exports of approximately US\$ 5.5 billion in 2002, or 9.1% of total Brazilian exports, benefiting 1,986 transactions of 460 exporters, with small and medium-sized companies representing 69% of the beneficiary companies and 70.3% of the disbursed transactions of up to US\$ 100,000.

The Proex has two modalities: direct financing (Proex Financing), and interest rate equalization payments (Proex Equalization). The Proex Financing is granted by the BB with resources from the Treasury directly to the exporter or to the foreign importer for payment to the exporter. Maturities can go to up to 10 years, depending on the product's value added or the complexity of the service rendered. The program does not have an expiration date. Exports with a domestic content of 60% or more are eligible for direct financing of 85% of their value, if the credit granted exceeds 2 years; for goods with a domestic content of less than 60%, the value eligible for financing is reduced proportionately. International market interest rates are applied; credits are in United States dollars or other convertible currencies. Up to 2001, resources used in the equalization modality exceeded those used under Proex Financing, but the situation was reversed in 2002 (see table 35). A problem with Proex is that its resources depend on both annual budget negotiations and the actual transfer made by the Finance Ministry, which tend to stay below the authorized values, a factor that largely explains why in table 35 the rate of utilization of allocated resources often falls below 100%. The uncertainty embedded in this system is a major drawback of the Proex, functioning as a disincentive for more export-oriented projects.

TABLE 35
Resources assigned to and used by Proex—1994-2003
(R\$ million)

Year	Proex financing			Proex equalization		
	Allocation	Utilization	% utilized	Allocation	Utilization	% utilized
1994	55.3	34.2	61.9	488.6	4.8	1.0
1995	142.2	28.8	20.2	840.0	32.9	3.9
1996	184.7	23.6	12.8	212.6	80.5	37.8
1997	205.5	106.7	51.9	625.2	227.3	36.4
1998	469.7	210.7	44.9	903.7	565.1	62.5
1999	803.4	318.9	39.7	749.0	749.0	100.0
2000	803.0	660.9	82.3	813.5	813.4	100.0
2001	1,138.2	874.3	76.8	1,239.9	1,144.2	92.3
2002	1,138.2	965.5	84.8	1,139.9	383.7	33.7
2003	1,218.5	722.6	59.3	1,056.2	882.5	8.6

Source: Banco do Brasil, *apud* WTO (2004).

The Proex equalization program pays for part of the financial cost of export credit provided by Brazilian and foreign banks (commercial and development), so as to lower them to the level observed in OECD countries. This equalization scheme covers just up to 85% of the value of exports, even if all of it is financed, and the

basket of eligible products and corresponding maturity periods are the same as in the Proex Financing, with the latter depending on the value added generated, or the complexity of the service rendered.⁴⁵

BNDES-Exim finances exports with a local content of at least 60% of their value. All exporters, national and foreign, can resort to the Program, whose list of eligible goods covers more than 80% of the list of goods exported by Brazil. In 2005, its disbursements mounted to US\$ 5.9 billion, almost all of which directed at manufacture exports, with a large concentration on transport equipment (68%). Operations, conducted through accredited financial institutions, can be carried out through one of the three credit lines available to exporters in Brazil or the one at the disposal of foreign importers. The former are:

- The pre-shipment credit, which has a maximum maturity period of 18 months (extendable in some cases to 24 or 30 months, depending on the good's production cycle) and covers up to 100% of the export value, with a cost that varies according to the size of the company: *a*) for micro, small or medium enterprises: the Long-Term Interest Rate—Taxa de Juros de Longo Prazo (TJLP)—or the 6-month LIBOR adjusted by the depreciation of the United States dollar; *b*) for large enterprises regardless the origin of the capital: the TJLP plus at least 40% of financing costs (market rates) in foreign currency. The BNDES charges, in addition, a remuneration rate of 1% to micro, small and medium enterprises, and of 2.5% or 3.5% to large enterprises, depending on whether the good financed.

- The short-term pre-shipment modality, with a maximum maturity period of 180 days, also finances up to 100% of the export value, with the interest rate varying according to the same rules that apply to the regular pre-shipment modality.

- The special pre-shipment credit, created in 1997, and which can be used only if there is an increment on export value. It has a maximum maturity period of 12 months (with possible extension to 30 months) and covers up to 100% of the export value in the case of small and medium enterprises and 75% for large enterprises, but credits are limited to US\$ 50 million per year per group. The interest rate charged varies according to the size of the company, following the same rules applicable to the regular pre-shipment modality. The BNDES remuneration, however, varies inversely with the actual increase in exports as a percentage of the expected increase.

The post-shipment modality operates as a buyer's credit, through promissory notes or letters of credit. Its cost equals the LIBOR corresponding to the financing period, plus a 2% BNDES' remuneration, plus the financial institution's remuneration. An administrative commission of up to 1% and a compromise commission of 0.5% are also applied. The maturity period can go up to 12 years, for up to 100% of the exported value, and may include services rendered in association with the goods exported, for up to 30% of the value exported (65% for engineering

45. Equalization is paid to the bank granting the credit to the exporter through the issue of Brazilian National Treasury Notes (NTN-I), which may be converted to currency on the dates when the credit's interest payments are made (on a semi-annual basis), or may be discounted for a lump-sum in the market. The bonds are issued in the name of the lending bank, and may only be redeemed in Brazil and in domestic currency, at the exchange rate prevailing at the time of payment. If the lending bank is located outside Brazil, it may appoint a Brazilian bank as its agent to receive the semi-annual payments on its behalf.

and construction projects or for projects to foster integration in the Americas, as approved by the BNDES).

Export insurance and guarantees: To protect exporters and their financiers against political, extraordinary, and commercial risks that may affect economic and financial transactions linked to export credit operations, Brazil counts with an export credit insurance scheme—Seguro de Crédito à Exportação (SCE). To fund that scheme, the government established in August 1999 an FGE, which covers risks insured by the SBCE and guaranteed by the Reinsurance Institute of Brazil—Instituto de Resseguros do Brasil (IRB), Brasil Re.⁴⁶ Any exporter financing or refinancing his/her exports may be covered. Since 2004, two other specialized institutions have been authorized to operate these insurance schemes in short-term transactions: Secresb and Euler Hermes. The SBCE is the only institution authorized to operate the SCE for medium and long-term operations. The value of exports covered by the SBCE totaled US\$ 738.9 million in 2003. Only government-owned banks (BNDES, BB) use the SBCE. Including short-term operations, total export credit insurance reached US\$ 1.0 billion in 2003 (2.4% of total exports), down from US\$ 1.6 billion in 2002 (4.3% of total exports), but up from US\$ 862 million in 2001. The main users of export insurance credit have been the civil construction and capital-goods sectors.

Short-term operations (up to 2 years) generally take the form of an annual global policy by the exporter, usually applied to products with shipment periods of up to 180 days. Export credit insurance coverage is limited to a maximum of 90% in the case of insurance against commercial risk, or a maximum of 95% in the case of insurance for political and extraordinary risk. Reinsurance coverage is provided by the IRB-Brasil Re. For long-term commercial operations (over 2 years), and for political and extraordinary risks of any term, coverage is provided through the FGE, represented by IRB-Brasil Re and made operational by the SBCE. Export credit coverage granted by the government varies in relation to risks involved, to a maximum of 90% in the case of insurance against commercial risk, or 95% in the case of insurance for political and extraordinary risk.

The Competitiveness Promotion Guarantee Fund—Fundo de Garantia para a Promoção da Competitividade (FGPC)—was created in 1997 to guarantee the risk of BNDES and Finame when financing micro, small, and medium enterprises that export, produce inputs to manufacture, assemble or package exports, or engage in projects to increase their competitiveness. Financing operations can be guaranteed, using FGPC funds, for 70% or 80% of its value, depending on the size of the enterprise, its location, and the type of credit received.

Another key instrument, especially important to facilitate the finance of manufacture exports to Central and South American countries, has been the Convênio de Pagamentos e Créditos Recíprocos (CCR), a compensation scheme among central banks in Asociación Latinoamericana de Integración (ALADI) countries and the Dominican Republic, which transfers the credit risk from the importer to its country's central bank. The CCR dates back from the creation of ALADI, but only in the 1990s it started to be used more intensely by Brazilian

46. The SBCE is a full member of the Berne Union and the Latin American Association of Export Credit Insurance Organisms (Alasece), and is regulated by Decree 3,937 of 25 September 2001.

financial institutions, notably BNDES. In May 2000, though restrictions on these operations were imposed with the objective of reducing Brazil's Central Bank (BCB) risk. The system was then almost discontinued, as these restrictions made it less attractive to exporters. Later on, exporters (and their financiers) demanded the re-establishment of CCR guarantees as a condition to increase intra-regional trade, especially because since 2000 political and commercial risk increased in many ALADI countries. In 2002, the BCB enacted new regulations on the matter on trade operations with Argentina, but still limited its guarantees to US\$ 200 thousand in short term operations (up to 360 days). Payment instruments of longer maturities were also allowed in the new CCR arrangement, when resulting from sales or purchases of Brazilian in the Argentinean market. These small caps limited the system's utility. New directives were announced at the end of 2003, re-establishing some of the previously existing features of the CCR, and some of them have already been implemented. Another complementary measure was the revision made on credit insurance policies with the objective of reducing the cumulativeness of guarantee costs of Brazilian exports. New operational norms of Proex (BB) were also implemented in late 2003 with the objective of easing credit conditions.

5.2.4 Trade promotion and marketing assistance

The Apex was created in 1997 as a department of the Brazilian Service of Support to Micro Businesses—Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (Sebrae). The Apex is in charge of export promotion in Brazil, with an emphasis on small and medium enterprises. Law 10,668 of 14 May 2003 transformed it into Apex-Brasil, an autonomous social service charged with executing export promotion policies, in coordination with public entities and in accordance with national development policies, particularly those related to industry, commerce, services, and technology. Apex-Brasil's main goals are both to increase and diversify Brazilian exports, with a mandate that focus particularly on export activities that may favor small enterprises and the creation of jobs.⁴⁷ It acts under an enlarged concept of export promotion, turned to the development of exportable output, not only export promotion (see MOTTA VEIGA; IGLESIAS, chapter 3, *apud* PINHEIRO; MARKWALD; VALS PEREIRA, 2002). It supports integrated sector projects; multi-sector projects; consortia formation projects (association of enterprises with an export objective); isolated projects; and develops its own projects. Proposals can be presented to Apex-Brasil by the Sebrae, public institutions, non-profit private entities, sector or regional associations, and cooperatives. Support is mainly granted to activities that contribute to enhance Brazil's exports, including seminars and workshops, market research, training, marketing and advertising, standards qualification, and participation in fairs abroad. Apex-Brasil's support is made through the co-financing of projects, generally

47. The Deliberative Council is Apex-Brasil's top managing body. This Council has representatives from both the public sector—Ministério do Desenvolvimento, Indústria e Comércio Exterior (MDIC), Ministry of External Relations, Camex, and BNDES—, and the private sector—the National Confederation of Industry/Confederação Nacional da Indústria (CNI)—the Brazilian Foreign Trade Association/Associação de Comércio Exterior do Brasil (AEB) and Sebrae. There is also a Fiscal Board, responsible for financial activities and internal control, with members from the MDIC, Camex and Sebrae. Apex-Brasil is currently linked to the MDIC.

limited to 50% of the total value, but up to 75% for projects considered of special social interest.⁴⁸

5.2.5 Export prohibitions, restrictions, licensing, EPZ and drawback mechanisms

The Inter-ministerial Commission for the Export Control of Sensitive Goods is in charge of preparing the regulations, criteria, proceedings and control mechanism regulating exports of sensitive goods and their related services. The Commission is in charge of preparing a list of sensitive goods and analyzing the provisions of the main international conventions and treaties affecting or involving the exportation of sensitive goods. Exports of goods considered sensitive⁴⁹ must be approved by the Ministry of Science and Technology, which presides over the Commission.

Prohibited items: Exports of some organic chemicals included in HS Chapter 29 are prohibited to non-signatories of the Montreal Protocol. Exports of jacarandá from the State of Bahia (HS 4407.29.90) are prohibited because this wood is becoming extinct. Exports of wood in the rough (HS 4403) have been suspended, except if certain conditions are met, and subject to prior approval of the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Ibama). Brazil also restricts exports to comply with United Nations resolutions: exports of weapons and military equipment to Iraq, Liberia, Sierra Leone, and Somalia are forbidden.

Quotas: Exports of certain woods (pine, imbuia, and virola), classified under HS headings 4407.10.00, 4407.24.10, 4407.24.20, and 4407.24.90, are subject to quotas. Brazilian exports of textiles and clothing listed in Annex C of Consolidation of Ministerial Acts (*Portaria*) Secretaria de Comércio Exterior (Secex) (exports) are subject to quotas in the Canadian, and United States markets. Under the agreement between the governments of Brazil and the United States suspending the U.S. countervailing duty investigation on hot-rolled flat-rolled carbon quality steel from Brazil, the latter agreed to a quantitative export limit of 295,000 tons, effective from October 1999 to September 2004.

Export licensing: Export licenses are required only for textile and clothing products to Canada and the EU, and are issued by the BB, by delegation of the Secex. Exports of textiles to the United States and Puerto Rico require the commercial invoice to be certified and stamped with a Visa; as determined in the Brazil-United States Bilateral Agreement on Textiles. The stamp is granted by the Secex through the BB.

Exports of a relatively large number of products are subject to prior authorization from different agencies, generally for safety, health, security or environmental reasons, or when they are subject to export quotas (there are 1,043 out of 9,730 tariff lines in this situation). The list includes: live animals; live plants; some

48. Between May 1998, when Apex started operations under Sebrae, and late August 2004, 431 projects were approved, of which 297 had already been concluded and 134 were ongoing. Project areas include: food and beverages; furniture; textiles and clothing; construction, machinery and equipment; audiovisual; and penetration of international markets. In the same period, Apex invested US\$ 152.9 million (an average of US\$ 350,000 per project), while its co-financing partners contributed US\$ 191.3 million.

49. As listed in Law 9,112 of October 10, 1995.

oils and resins; hides and skins from wild animals; some types of wood; a range of chemical products, in particular those in HS Chapter 29; a group of medicines; uranium and some other metals; weapons; and some vehicles and aircraft. They represent some 10.7% of all tariff headings at the eight-digit level.

Export subsidies: In 2001, Brazil notified as subsidies for the period 1996-1999 under the SCM, the Befiex and the Proex. In an updating notification in 2003, the two programs were excluded. As notified to the WTO, the Befiex program was discontinued on 31 December 2002, when all existing contracts were terminated. No new programs had been approved since 1990. The Proex program was redefined as a consequence of a WTO DSB ruling that found it to be an export subsidy (appendix B). Brazil has notified WTO Members that in 1999-2001 it did not grant export subsidies to agricultural products. In prior notifications, Brazil had stated that no exports subsidies to agricultural products were granted for the 1995-1998 period.

Drawback: The Brazilian drawback system provides for the suspension, exemption or restitution of import taxes, the IPI, ICMS, AFRMM, and other taxes, when the imported goods, inputs or parts, are used to produce exportable goods or to package them. Beneficiaries are industrial or commercial enterprises engaging in foreign trade. As a guideline, to receive those benefits, the value of exports should be at least 40% higher than the imported inputs. The drawback regime is considered to be an export incentive in Brazilian legislation.

The drawback regime has three modalities: suspension, exemption and restitution. In the first two cases, the benefit is granted by the Secex; in the third, by the Ministry of Finance's Secretariat of Federal Revenue—Secretaria da Receita Federal (SRF). In the suspension modality, the payment of import duties and other taxes is suspended for goods to be exported after transformation or assembly. The Secex grants this benefit electronically for the minimum period required for importation, manufacture and exportation, with a maximum of 2 years; if the imported goods are destined to produce capital goods with a long production cycle, the benefit may be granted for a maximum of 5 years, but extensions of these benefits may be given.

The exemption modality allows the importation, free of import duties, the IPI, and the AFRMM, of inputs in a quantity equivalent to those already imported with complete tax payment, and already used for the production of exported industrial goods. Procedures and conditions are the same as for suspension, except that interested companies must also present a request to benefit from the regime to the BB's office corresponding to their jurisdiction, as well as proof of the imports and exports made. The restitution modality consists in a devolution of taxes already paid, through a fiscal credit to be utilized in any subsequent import operation

As part of the strategy to reduce administration costs and make foreign trade procedures more responsive, a new electronic drawback system was put in place on November 1, 2001. The electronic drawback system is available only for the suspension modality. The system operates through the Sistema Integrado de Comércio Exterior (Siscomex) and integrates export and import operations. To

benefit from the electronic drawback system for their imports, exporters must obtain an import license, processed and granted automatically through the Siscomex.⁵⁰

Special System of Industrial Depots Subject to Standardized Control—Regime Aduaneiro de Entrepósito Industrial sobre Controle Informatizado (Recof): Created by Decree 2,412 of March 12, 1997, this system suspends the payment of import taxes and the IPI on merchandise imported for purposes of industrialization and production of goods for export. The suspension period is 1 year, with the possibility of an extension for one additional year. The main difference between the Recof and the drawback suspension is the type of beneficiary (see below). Also, approval of concessions in the case of the drawback is done by import operation, while approval of benefits under the Recof is by importer.

In 2001, the conditions governing the use of the Recof were redefined. Beneficiaries must have capital equal to or above R\$ 2 million (some US\$ 700,000), and must commit to export a minimum of US\$ 10 million per year in the first 3 years of use of the regime, and an average of US\$ 20 million as from the fourth year. Beneficiaries must also commit to cap sales to the domestic market at a maximum of 20% of the goods imported under the regime. Authorization to benefit from the Recof must be obtained from Brazil's federal tax authority (SRF).

Export-processing zones (EPZ): EPZs have not been used in Brazil so far.⁵¹ As usual, firms operating in EPZs must export 100% of their production. Benefits for companies established in EPZs include import duty and IPI and ICSM exemptions. Companies are also exempt from the AFRMM and the Tax on Financial Operation—Imposto sobre Operações de Crédito, Câmbio e Seguro, ou relativas a Títulos ou Valores Mobiliários (IOF). Brazilian legislation distinguishes between EPZs and free-trade zones (FTZs): enterprises in the latter may sell in the domestic market, while all EPZ production must be exported.

The administration of EPZs is under the supervision of the National Council of Export Processing Zones—Conselho Nacional das Zonas de Processamento de Exportação (CZPE). The CZPE has not been active since the mid 1990s and its last meeting took place in April 1997. The CPZE is responsible for granting EPZs concessions, which have a validity of 20 years, renewable for another 20. As at 2000, 18 EPZs had been authorized but none was yet in operation. In response legislation was passed in 2000 to allow for the dismantling of EPZs that were not in operation. Decree 3,560 of August 14, 2000, established the procedures to declare the expiration of EPZs concessions if authorized EPZs did not provide, within 30 days, a schedule for installation and started the appropriate infrastructure work. There have been no declarations of EPZ concession expirations so far.

Other export-related tax concessions: Remittances abroad for the promotion of exports, including market research, promotion of products, rent of stands, and participation in fairs are zero rated for income tax; in accordance with Decree 3,793

50. In its first year of operation, the electronic drawback system processed some 5,000 operations and approved over 4,000 for a total of some US\$ 4 billion.

51. The legislation exists, though. The main legislation regulating EPZs is in Decree Law 2,452 of 29 July 1988, Law 8,396 of 2 January 1992, and Decree 846 of 25 July 1993.

of April 19, 2001; rates generally applicable are 15% or 25%. Requests must be submitted to the Departamento de Operações de Comércio Exterior (Decex), as specified in Ministerial Act (*Portaria*) Secex 7 of May 21, 2001.

Exporters may obtain tax credit as compensation for the social contributions—Programa de Integração Social (PIS)/Programa de Formação do Patrimônio do Servidor Público (Pasep) and Cofins (see below)—paid for the acquisition of inputs and packaging material used for export. The amount of credit is calculated by multiplying the ratio of export earnings to total earnings by 5.37%, in accordance with Ministerial Act (*Portaria*) MF 64 of March 24, 2003. The tax credit obtained is used against IPI payments due on sales in the domestic market. Unused credit may be transferred to other companies.

The Special Regime for the Exportation and Importation of Goods Destined to the Exploration of Petroleum and Natural Gas—Regime Aduaneiro Especial de Exportação e de Importação de Bens Destinados às Atividades de Pesquisa e de Lavra das Jazidas de Petróleo e de Gás Natural (Repetro), created by Law 9,478 of August 6, 1997, allows for the “fictitious exportation” and subsequent importation, under the suspension modality of the drawback regime, of goods produced in Brazil sold in foreign currency to a person domiciled abroad for use in the exploration of petroleum and natural gas in Brazil. In this way, the application of federal and state taxes on these goods is suspended.

6 FINAL REMARKS

Brazil has been experiencing a vigorous export boom since the beginning of the present decade, during which export expansion accounted for four-fifths of GDP growth (2001-2005). This occurred despite the economy being still relatively closed: trade flows of goods represented 18.4% of GDP in 2000, increasing to 24.2% in 2005. As a result, Brazil became a more important global player, with its share in world exports going from a low 0.8% in 1999 to 1.1% 6 years later. This good performance partly reflected the elimination of the previous bias against exports—and, in particular, agricultural exports—which had lasted until the mid-1990s, when trade liberalization, greater openness to FDI and the adoption of a more competitive exchange rate after 1999 gave a big push to exports. The strong performance of the world economy since 2002 has been another important factor, besides structural reforms (notably privatization), as well as targeted government interventions. Public policy was also important in the development of new seeds by Embrapa, a state-owned company.

There are several commonalities between this and previous export booms. First, it reinforced the country’s diversified trade relations, with additional exports concentrated in non-traditional markets such as China, Russia, Africa, and South and Central American, non-Mercosur member countries. Second, it did not change the relative share of manufactures in Brazil’s export basket, despite the excellent performance of agro-based exports since the early 1990s. Third, both agricultural and manufacture exports have experienced an increasing product diversification. Yet, innovations, defined as new goods entering the export basket, were relatively unimportant, except for some specific markets.

Brazil has traditionally been more export-oriented and had a more diversified export basket than most other Latin American countries, partly as a result of being a larger economy, but also on account of economic policy. Most of the diversification of exports took place in the 1970s and 1980s, reflecting the rise in manufacture exports. In particular, the sector structure of Brazil's exports changed substantially between the mid-1960s and the early 1990s, mimicking to some extent what happened to world trade. The share of agricultural products in total exports declined from 54.8% (1967) to 11.6%. The share of food products, in turn, increased from 17% in 1967 to 28.2% in 1973, but subsequently shrank to 18.4% in 1995. Incentives to manufacture export played an important role in this process, but policies targeted at fostering the expansion of domestic output capacity in specific sectors—such as paper and pulp, nonferrous metals, petrochemicals, oil and capital goods—were also important.

An index of structural change of sector exports shows that the sector composition changed more pronouncedly in 1973-1979, coming the 1967-1973 period in a close second. In both 1979-1984 and 1984-1989 structural change was less intense than in 1967-1979, decelerating to almost no change in 1989-1995 (the period with the smallest value for the index). This is broadly consistent with the idea that the diversification of Brazilian exports was more intense in the initial years of the post mid-1960s period than in the more recent sub-periods. Overall, there has been a continued process of export diversification, which strengthens the argument that in a large economy such as Brazil's export expansion tends to rely more on extending the basket of exports—the extensive margin, in Hummels and Klenow's (2005) terminology—than on exporting more intensely in the same traditional sectors. In addition to that, sectors whose exports expanded more in 1975-2005 had in general lower export volumes in 1975, causing a certain degree of convergence in the shares of each sector in total exports.

The evolution of the HHI for sector exports during 1975-2005 shows a substantial fall throughout the 1975-1995 period, followed by a decade of a more constrained fluctuation. The rise in the exports HHI in 2004-2005 reveals, though, that the resurgence of “traditional” exports has also been an important feature of the recent boom. Still, the concentration of exports remained relatively unchanged from the late 1990s to 2004-2005. This shows that export innovations, defined as products exported in the early 2000s but not in the late 1990s, were not a critical element behind Brazil's export boom in this period, except for a few non-traditional markets. Indeed, one important feature of the recent boom was the enhanced diversification of Brazil's export markets. While in previous phases rapid export growth led to considerable sector diversification, the hallmark of the recent period was regional diversification.

Changes in competitiveness caused by economic policy and comparative advantage shifts were at the root of the observed record. They were particularly important with respect to manufacture exports during most of the period since the 1960s. Comparative advantage also changed substantially in recent years, as exports surged following the exchange rate regime change in early 1999. These positive results are no doubt associated to export expansion, especially after 2002, when the effects of the new exchange rate regime began to be fully felt. They have also been

associated to strong productivity gains in the 1990s, particularly following import liberalization. Real effective exchange rates, however, have appreciated after 2002. Efficiency gains brought about by import liberalization (plus the importance of sunken costs and increased commodity prices) have exerted a non-negligible influence on keeping export growth even during the recent phase of real effective exchange rate appreciation.

Brazil's remarkable export performance resulted mainly from the ability of incumbent exporters to *a)* benefit from the high growth in world trade, while increasing somewhat their market shares in some traditional markets (the United States of America and Argentina, in particular); *b)* regionally diversify the exports of traditional goods, in a process that can be dubbed as "new markets discovery". A list of stylized facts that are consistent with our view that one of the main driving forces behind the recent export boom was the regional diversification of incumbent exporters includes the following:

a) The favorable performance of world trade in this period, regarding both quantities and prices, was an important driving force behind Brazil's recent export boom. By just managing to sustain its share of world exports at the 1999 level, Brazil would have been able to accelerate the average annual expansion of its exports from 0.8% to 10.4%. But the rise in Brazil's share in world exports indicates that there was more behind the export boom than just surfing the good performance of the world economy.

b) The rise in export prices (24% in 2000-2005) was an important factor behind the good performance, but not an explanation of why it excelled that of world trade, since the price of world imports also increased substantially (22% in the same period). Moreover, Brazilian export prices had contracted much more substantially than world import prices in 1996-1999.

c) The increased competitiveness of agriculture was an important factor behind this boom, but other sectors also expanded their exports vigorously in this period. The upturn in exports was led by primary goods, but only gained steam with the acceleration in the growth of manufacture and semi-manufacture exports after 2001. Thus, the recent export boom was relatively widespread across sectors: only one (coffee) out of the 28 industries showed a decline in its export/output ratio between 1999 and 2005.

d) The Brazilian performance was helped by the large increase in the number of exporters, although incumbent exporters accounted for the bulk of the increment in export values. Thus, although entry was important, it was not the main driving force behind the export boom. Indeed, exports continued to rise in 2005, although there was a net exit of roughly one thousand exporters in the year.

e) New export discoveries—products that were either not exported before (innovations) or that experienced a surge in export values (evolutions)—did not account for a significant fraction of the rise in exports. Thus, notably in 2002-2004, Brazil's export boom stemmed essentially from the increase in the market shares of traditional exports, most of which were primary and semi-manufactured exports, or manufacture exports of capital goods and scale-intensive industries.

f) At the country level, though, innovations were much more important. In particular, country specific innovations played a decisive role in non-traditional markets (India and Russia, for instance). Very few of these country-innovations were global innovations: almost all of them were products that had been exported in the late 1990s. An opposite situation was found in traditional markets, in which country innovations represented between 25% and 40% of the goods exported, but accounted for only between 1.9% and 5.1% of the value of exports to these countries. On the other hand, this was the group with the largest proportion of global innovations in the basket of exported goods. In particular, the United States of America and the EU seem to be the preferred testing places for new Brazilian exports. Finally, there is an in-between group of countries, in which we find China and a number of Latin American countries.

g) Overall, innovations and evolutions at the country level were important drivers of the regional diversification of export markets, and contributed to sustain the level of Brazilian exports when prices and/or demand were falling in traditional markets such as the EU, Japan and Argentina in 1998-2002

Two decomposition exercises were performed with the objective of evaluating the main factors behind export performance. The first one is a CMS exercise, and the second one is an extension from Hummels and Klenow's model (which allows for a more complete decomposition, because of the finer sector and country compositions permitted by the use of the new database). Although the CMS approach was applied to long-term data, we next comment on the decade 1995-2004, subdivided into 1995-1999 and 1999-2004 due to the difference in exchange rate regimes in each of them.

Brazil experienced only modest export growth between 1995 and 1999. As a result, the decomposition of total exports growth produces large (and somewhat distorted) figures. Despite the relatively low growth of world trade in this period, its contribution to foster Brazilian exports was clearly positive. Indeed, had Brazil's exports grown at the same rate of world trade, they would have expanded about 8 times as much as observed. The results also show that in 1995-1999 Brazil was able to direct its exports to relatively dynamic goods and markets, as expressed in the positive commodity composition and market distribution effects. There was, though, a general loss of competitiveness. A partial explanation for the highly negative competitiveness effect may be the drop in Brazilian exports prices, which exceeded that of world imports. Indeed, a remarkable feature of Brazil's exports in 1995-1999 was the low expansion in their value, despite the very substantial rise in the quantum of exports.

The situation changed markedly after 1999, when Brazil was able to improve its share in world exports amidst fast world trade growth. Still, the latter accounted for a sizeable share of the total change in export values. Both the commodity composition and market distribution effects were negative in this sub-period, meaning that between 1995 and 1999 Brazil concentrated its exports on goods and markets that grew less than the world average. This component is especially significant as far as the market distribution effect is concerned, as it subtracted 11.2% from the total change, while the commodity composition effect subtracted only 3.5%. This result probably

stems from the initial high share of Brazil's exports to the EU, Japan and Mercosur, which expanded below the world average, whereas the large increase in exports to China, Mexico and other less traditional markets was captured in the residual term. Similarly, the commodity composition effect does not fully capture the impact of the large increase in export prices in this period, for some of the goods that benefited the most also expanded their share in total exports during this period. Both these changes are captured in the residual term and reflected in a large competitiveness increase, which accounted for 50.5% of total export growth.

Results for the decade as a whole show that, as in 1999-2004, the large expansion of Brazilian exports matched to a large extent that of world trade, as reflected on the 77% share of this effect yielded by the CMS decomposition. But, contrary to 1999-2004, both the commodity composition and the market distribution effects resulted modestly positive (with shares of 3% and 6%, respectively) due to changes that occurred in the first sub-period (1995-1999). The overall competitiveness effect accounted for 13% of total export change in this period.

The second decomposition we used to analyze export performance separates out the effect of an increase in demand from changes in Brazil's participation in each country's overall imports. But it further decomposes this second element into an enlargement in the basket of exported goods and changes in the market share or the relative price of goods previously exported, with the latter possibly reflecting unmeasured changes in relative quality at the product level.

This decomposition builds on Hummels and Klenow's (2005) differentiation between extensive and intensive margins. However, rather than comparing different countries at a certain point in time, we contrast the same country in different moments in time, which brings in the effect of changes in demand. From this exercise we learnt that world trade growth (total imports of all countries considered in the analysis) is the single most important effect in the two sub-periods, as well as for the total decade. For the period 1995-2004 as a whole world trade growth accounted for 69% of Brazil's export growth. Diversification was second in importance, accounting for 31% of export change. Changes in price margins and quantity effects were of lesser importance and compensated each other. This indicates that the quality of goods exported decreased somewhat, while the quantity effect was modestly positive.

Decomposition results for the sub-periods just mentioned are very different, as expected from the previous analysis. Indeed, for 1995-1999, when Brazil's exports expanded by a mere 5%, world export growth proceeded at a much higher pace. Diversification represented the second factor, followed by (modest) price margins increases, which represent quality improvements. The market share (quantity) effect was negative.

From 1999 to 2004 effects had very different weights. Growth of world imports was the most important factor (accounting for 51% of Brazil's 69% export growth), followed by a quantity effect that came to represent nearly 30%. This means that Brazil was able to penetrate foreign markets due to strong increases, or deepening of existing markets. In the third place we find the diversification effect, with one-fourth

of the total exports growth rate. The price margins effect resulted slightly negative in this period, indicating a relative decrease in the quality of goods exported, or that Brazilian exporters took advantage of a depreciated exchange rate to reduce average price margins—counterbalancing the fact that strong foreign demand and a commodity prices boom made for better prices of a number of important goods in Brazil's export basket.

The analysis on agriculture exports departs from the fact that Brazil has traditionally been more export-oriented than the manufacturing industry: agriculture accounted for 26% of the country's exports in 2005 (almost thrice its share in GDP). However, between the early 1960s, when the last phase of ISI began, and the early 1990s, when trade liberalization moved domestic terms of trade back in favor of agriculture, its share of total exports declined almost steadily, stabilizing since the late 1980s around 28%. In the 1960s and 1970s, exports of agricultural goods expanded in nominal terms, although not as fast as exports of manufactures. But in the 1980s they actually fell. To some extent this performance reflected the higher dollar inflation in the 1970s, while in the 1980s the strengthening of the dollar caused export prices to rise much more slowly. In 1971-1979, the price of Brazil's agricultural exports more than doubled, whereas in 1980-1990 it fell most of the time.

In the early 1990s, with trade liberalization and other policy reforms, agriculture exports went up vigorously, only to drop again, together with overall exports, with the currency appreciation in the early years of the Real Plan. This drop stemmed exclusively from the 43% contraction in agriculture export prices between 1997 and 2002, in the wake of the Asian and Russian financial crises, and the ensuing deceleration in world GDP growth. Indeed, in this period, despite falling prices, agriculture export quantities went up a remarkable 81%, partly as a consequence of the 1999 exchange rate devaluation. In the following years, with the acceleration in world economic growth, quantities and prices increased and the value of agriculture exports rose strongly—in this case, in tandem with non-agricultural exports. Despite this large expansion, the share of agriculture in total exports declined slightly, from 28% in 2002 to 26% in 2005. The substantial rise in exports helps to explain the good performance of the agriculture sector in the last 15 years: from 1991 to 2005, its GDP grew annually an average 3.5%, against 2.1% in industry and 1.8% in services.

As of 2005, Brazil had become one of the world's largest agricultural exporters. In quantity terms, it is now the world's leading exporter of soybeans, sugar, coffee, beef and veal, poultry, orange juice and tobacco, and the second largest of soybean oil and meal. In addition, it answers for a substantial share of world trade in wood and leather, including derived products. Brazil is also the world's largest producer of coffee, sugar and orange juice, and the second largest of tobacco, soybeans and beef. But the export orientation of Brazil's agriculture is not uniform across products: while in some cases, notably orange juice, most output is exported, in others the lion share of production goes to the domestic market, as in the case of meat. In other, less export-oriented crops, such as rice, wheat and dairy products, the share of domestically consumed output is even larger. Overall, despite the recent boom, only

about a third of agricultural production is exported—compared with 41% in Canada, 74% in Australia, and 22% in the United States.

The recent boom in agriculture's exports was diversified in both composition and direction of trade, and this has been one of its strengths. The country has a geographically varied climate, with both tropical and temperate zones, the potential of which had not hitherto been fully exploited as a source of comparative advantage. This seems to be changing. The value of all of Brazil's main agricultural exports at least doubled between 2000 and 2005 (except for fruit juice), with a significant diversification away from typical tropical products (coffee, sugar and orange juice). The main contribution for the rise in agricultural exports in this period came from meat, followed by soybeans and derived products and sugar. This marked a break with the relatively high concentration of export growth, notably in 1980-2000, when soybeans and derived products and fruit juice accounted for over three-fourths of the rise in agriculture's exports. As a consequence, the composition of agricultural exports changed significantly, with its concentration declining from 1996 to in 2005.

Another reinforcement of historical patterns, and a positive feature of the recent boom, has been the diversification of export destinations, away from the EU, the United States and Japan—which, however, still account for about half of Brazil's agricultural exports. Thus, over half of the increment in agricultural exports in 2000-2004 went to countries that answered for less than a third of this total in 2000. This was critical to overcoming the limitation imposed to agricultural exports by high tariff and non-tariff barriers in OECD countries.

In 1991-2005, Brazil's share in world agricultural exports rose from 2.7% to 4.5%, well above its participation in total world exports. Several factors contributed to enhance the competitiveness of Brazilian farmers: the positive effects stemming from policy reforms; public-financed investments in technology, human capital and infrastructure; and short-term positive shocks. These factors fostered a major improvement in productivity and a more intense use of capital and intermediate imported inputs, the price of which fell with trade liberalization. This rise in productivity largely explains the increase of agricultural output in this period—expanding the agricultural area in order to expand output was only necessary in the current decade.

The remarkable performance of agriculture relative to industry and services in the last 15 years owes much to the structural reforms of the 1990s, especially trade liberalization and the elimination of quantitative restrictions (licenses, quota and taxes), reducing the implicit taxation of agriculture. Until the late 1980s, agro-food imports were subject to high tariffs, quantitative restrictions, importer advance deposits (replaced later by an import transaction tax), licensing and import authorization requirements. Agro-food exports were at times restrained, at times encouraged, depending on the particular economic and political context.

Concerning the pace of reform, a more transparent and simplified tariff schedule was adopted from 1990 to 1992, providing for a phased reduction in import tariffs. In the meantime the main non-tariff barriers to trade were removed, including those related to agricultural commodities and agricultural inputs. The main landmarks of liberalization were: abolition of export licensing (1987); elimination of quantitative

restrictions on exports of soybeans, soybean oil and meal, maize and cotton (1989); end of the state monopoly on wheat marketing and trade (1990). In 1995, both the disciplines established by the Uruguay Round Agreement on Agriculture on market access, export competition and domestic support, and the Mercosur Customs Union came into force, with free-trade within the common market area prevailing for about half of Brazil's agro-food imports. In 1996 a new legislation exempted raw materials and "semi-industrialized" exports from ICMS taxes, which benefited agriculture directly.

Those reforms had a beneficial impact on productivity, with yields increasing significantly in the 1990s. As expected, yields of importable crops increased more than those of exportables, for which yields were already relatively high. The impact of reform on exportables was more modest, the major exception being soybeans. While in agriculture it was the rise in yields, rather than an expansion of agricultural area, that underpinned output growth, livestock productivity (weight per animal) rose more modestly, and the increase in output stemmed mostly from the expansion in the number of animals slaughtered.

Overall, both labor and land productivity went up substantially in the 1990s, while capital productivity rose more slowly, so that the sharp improvement in yields overstates gains in TFP. Although we do not have separate estimates for the 1990s, TFP has increased much faster in recent years than during the import substitution period. Thus, while in 1961-1981 TFP growth in Brazilian agriculture was only a fraction of that observed in Argentina and Latin America as a whole, this situation was reversed in 1981-2001.

The timing of the upsurge in agricultural productivity and output highlight the effects of market-oriented reforms. As in manufacturing, trade liberalization forced producers of importables and those in formerly regulated markets (notably wheat, milk, sugar and coffee) to compete. Moreover, in the 1990s there was a scaling down of expenditures on price support and subsidized credit, which also forced producers to become more productive, facilitating new entries and expelling inefficient farmers. Trade liberalization also reduced input prices (especially machinery) at a faster pace than output prices were falling, helping to sustain profitability. Yields improved thanks also to agricultural research tailored to climatic conditions in the Center West. Other factors also contributed to raise agricultural productivity, such as: the substitution of more productive land in new areas for less productive one in traditional areas (linked to the development of new technology), causing an increase in the average size of farm operations, with farmers reaping greater gains from economies of scale; greater fertilizer consumption, which more than doubled between 1990 and 2000 (when planted area remained constant) and price stabilization, with the Real Plan, which helped to establish a more stable investment climate.

The contribution of Embrapa-developed technology, as well as that of earlier investments in infrastructure (1970s and 1980s), highlight the public sector's role in fostering the competitiveness of Brazil's agriculture. Also important was its contribution to the accumulation of human capital, through the public university system, from which a large number of professionals graduated in agricultural and forestry engineering, veterinary, and zootecny. Moreover, the sector was a net

recipient of resources from the rest of the economy, through subsidized credit programs, encouraging the use of fertilizers, machinery and equipment.

Total public support to agriculture has been estimated at 0.5% of GDP on average per year in 2002-2004, a figure that is well below the observed rates in most OECD countries, and roughly comparable to Australia's and New Zealand's. Three-quarters of the total correspond to support given directly to farmers, while general services delivered to the sector (research and extension, training, and the development of rural infrastructure) account for the rest. Agricultural research, extension and education together comprise one half of the overall spending on general services. Expenditures with general services have lost importance in recent years, raising concerns about the sustained performance of research programs.

Although in the past farmers have benefited from larger resource transfers, since the mid-1990s these have become relatively small for international standards. Public support to farmers includes price support and stabilization mechanisms, as well as credit at preferential conditions, to finance production, investment, and marketing. The focus has traditionally been, and remains, on financing farmers at special terms, until recently directly by public banks. In particular, legislation mandates banks and other financial institutions to assign 25% of their demand deposits for rural credit operations, at pre-established conditions. Support is granted through government-controlled interest rates and through equalization schemes, when credit is provided by the private sector.

Since the mid-1990s, greater emphasis has been given to attract private finance to the sector, although the public sector continues to play a central role. In addition to intermediating rural savings funds through state-owned banks, to which the special provisions apply, BNDES has two general credit lines for investment in the agriculture sector. Overall, there are eight specific BNDES programmes for agriculture. Although they generally follow the terms granted for general credit, the scope and conditions of these programmes vary, but they are all *concessional*. Commercial agribusinesses are also typically financed directly by clients (such as soybeans crushers or orange juice producers) and suppliers (such as fertilizer). There are no specific export credit programs for agriculture, but agro-food exporters can resort to three general government-sponsored programs: the Proex, BNDES-Exim credit, and FGE. The BB finances the exporter (supplier credit) or directly the importer (buyer credit) under the Proex scheme. Interest rates are based on international market levels (LIBOR as a minimum). BNDES-Exim credit is offered by the BNDES and applies to a wide range of goods and services, including agricultural products.

Of late, the competitiveness of Brazilian agriculture has also benefited from positive shocks, including the 1999 exchange rate devaluation, the pick up in world economic growth since 2003, the rising demand for food products from low income countries, notably China, and the outbreak of foot-and-mouth disease (gradually eliminated in most Brazilian states) and BSE in Europe, the United States and Canada.

Is it possible to extrapolate the remarkable performance of Brazil's agriculture exports in 1991-2005 into the future? The answer is yes, conditioned on the

expansion in transport infrastructure and the success of multilateral negotiations in lowering subsidies and barriers to free world agricultural trade. Reasons for our guarded optimism are:

- Rapid economic growth in China and India should rescue hundreds of millions people out of poverty, boosting the demand for food; therefore, the demand for agricultural products should stay strong for some time yet.

- Brazil's agricultural area is exceeded only by China, Australia and the United States, and it still counts with a relative abundance of low-cost land. Different estimates point to the existence of more than 100 million hectares of arable land in the Cerrados area alone. Moreover, there are between 170 to 180 million hectares used for low productivity pastures that could be converted into arable cropland.

- Brazil has favorable conditions of soil, temperature, access to water and lightening in different regions of the country. In particular, with the new planting methods being adopted, they allow farmers to harvest two crops in a single year. In addition, low weather risk, notably in the Center West, mitigates the consequences of a poorly functioning insurance system.

- Continued support to research and development activities should guarantee that productivity keeps rising in agriculture. Indeed, as shown in table 30, there is still room for some catching up with respect to best practice in agricultural productivity for all main Brazil's exports.

- Farmers have also integrated well crop plantation and cattle raising activities, with Brazil benefiting from being a large producer in both segments.

- Expansion of agriculture to the Center West and other Cerrado savanna areas in the Northeast have fostered large scale production, generating economies of scale and higher productivity.

- Brazil has invested heavily in human capital, with the establishment of several courses in agriculture engineering, forestry, zootecny, and biology in good universities. These should assure the supply of well-educated professionals for the sector.

- With temperate and tropical regions, and the technological expertise to produce under both types of climate, Brazil has diversified its agricultural product mix and export basket, reducing the risk of downturn in either of them.

- Brazilian agribusiness has used the windfall gains of recent years to sophisticate its activities intensifying the use of information systems and international connections, with the emergence of highly sophisticated operators, in agriculture itself and in down and upstream activities.

There are, on the other hand, reasons for concern about the long-term sustainability of Brazil's exceptional agricultural export growth. For one, productivity gains and the lowering costs of inputs stemming from trade liberalization and sector reforms, which fostered the reallocation of resources to agriculture, and within it to the sub-sectors in which Brazil has greater comparative advantage, are partly once and for all, so it might be unrealistic to simply extrapolate them into the future. Moreover, the more recent export rally (2000-2005) owes much to positive shocks,

such as a weak currency, low interest rates and plenty of liquidity in OECD countries, and the booming world economy. As these more transitory factors lose importance, the competitiveness of Brazil's agriculture will become more dependent on structural factors, some of which remain unfavorable, from infrastructure bottlenecks to trade barriers. Domestically, some of the weaknesses are:

- A poor transportation and warehousing infrastructure. Because producers in Brazil are typically a long distance from their main markets, and a relatively large share of the country's agro-food exports tends to be in the form of bulk commodities, transport costs are important for Brazilian exporters, making the deficiencies of the internal logistics system an important drag on their competitiveness. Lack of transport infrastructure is also a major hindrance to expanding agricultural area. As the agricultural frontier goes deeper into Brazil's interior, the poorly developed road network becomes a key determinant of agricultural growth. In particular, this dearth of infrastructure may constrain the rapid conversion of permanent pasture into crop land.

- Environmental restrictions. This will gain importance as the agricultural frontier moves into the Amazon region, notably because livestock farmers dislodged by the conversion of pasture to crop land tend to move further into Brazil's inlands, threatening the Amazon rainforest.

- Sanitary risk, which will tend to rise as the volume of production expands. Public investment in supervision, control etc. has to rise compatibly with the expanded scale of output, but recent outbreaks of foot and mouth disease suggest that this has not always been the case. If tariffs and quotas are reduced as part of trade negotiations, it is likely that phyto-sanitary barriers gain importance.

- The high cost and low availability of capital, which limits capital deepening and dampens productivity growth. Commercial agribusiness are less constrained in this regard, for they tend to be financed by clients and suppliers; exporters, in particular, who are paid in hard currency, have another lever to reduce their cost of credit, but producers obliged to borrow on the domestic market are especially penalized, despite government subsidies.

- The considerable scope for poorer Brazilians to consume more foodstuffs, notably products with relatively high income elasticities (such as meat and fruit and vegetables), which will reduce the attractiveness of export markets.

Access to the markets of its trade partners is, though, by far, the most critical barrier to the sustained growth of Brazil's agricultural exports. Brazilian exporters face a range of difficulties in gaining access to foreign agricultural markets, especially among OECD countries. They are impeded by high tariffs in key markets, tariff escalation according to the degree of processing for several important commodities, unfavorable treatment under trade preference schemes and tariff-rate quota systems, and significant non-tariff measures (notably for livestock products). It has been shown that Brazilian agriculture products face the highest average tariff among the participants of a would-be FTAA, and thus have much to gain from agricultural trade liberalization. The main barriers include:

- High tariffs in key markets, notably for sugar, poultry, orange juice, beef, pork, and tobacco.
- Tariff escalation according to the degree of processing, which are especially detrimental in the soybean sector and for processed food products and coffee.
- Discriminatory import regimes, such as country-specific TRQ allocations, and preference schemes, which typically are unfavorable to Brazil. These mechanisms are relatively important in the sugar, beef and cotton sectors and are applied most by the countries that represent Brazil's biggest overall markets: the EU, the United States, China and Russia.
- Non-tariff measures, such as sanitary and phyto-sanitary regulations, which are a particularly relevant barrier for meat products.

As they stand, high agricultural tariffs and non-tariff barriers in most countries, and subsidized production and exports by rival suppliers in rich countries, heavily discriminate against Brazil and impede it from fully exploiting its comparative advantage in agriculture. The expansion recorded in the last 15 years depended much on the geographical diversification of export markets, but this alternative has a limited further potential, perhaps with the exception of the Chinese markets. Therefore, among the areas in which an agreement on reforms is being pursued, market access is paramount for Brazil, and the country has actively sought in WTO negotiations to liberalize agricultural trade, as well as fought against production and export subsidies by rich countries within the WTO dispute resolution framework. In both multilateral and regional trade negotiations, market access to agricultural products has been a central goal of Brazil's policy makers.

Most simulation exercises show that Brazilian exporters stand to gain substantially from a new round of multilateral trade liberalization that expands market access. Agricultural trade reform would be especially important. In particular, a large part of Brazil's welfare gains would come from tariff reductions on agricultural products by OECD members. It has also been estimated that agricultural market liberalization would cause Brazil to greatly expand output, partly as a result of substantial price increases in meat and dairy products. In the absence of sweeping reforms in world agricultural trade, Brazilian agriculture export growth should lose steam.

Among our main findings, it should be stressed that the vigorous expansion of Brazil's exports in the first years of the present decade reflected a combination of: strong increases in the imports of leading importers, notably the United States of America; a diversification of the basket of goods exported to other main importers, China and Mexico in particular; and a rise in Brazil's market share in the Argentine market. On average, there was a decline in the relative price of Brazilian exports in each market vis-à-vis those of other countries, with Mexico being the only relevant exception, most likely reflecting an unmeasured improvement in product quality. Two countries, the United States of America and China, account alone for roughly 44% of the expansion in Brazilian exports between 1995 and 2004—adding Argentina and Mexico, this share climbs to 60%.

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ANNEX

DECOMPOSITION METHODOLOGIES⁵²

A.1 Constant Market Share (CMS) decomposition of export growth

The CMS decomposition method is based on the assumption that a country may experience export growth above the world average—i.e., increase its share of world exports if its exports: *a*) are concentrated on goods for which demand is growing faster than the world average; *b*) its markets are expanding faster than the world average; *c*) its exports benefit from competitive gains (see LEAMER; STERN, 1970). This last term, obtained as a residual result from a complex interaction of demand and supply factors such as productivity increases and differentiated rates of quality improvements, marketing and firm's strategies, factor endowments, economic policy etc.

Thus, a given country's export growth can be decomposed in four factors: *a*) due to world trade growth; *b*) due to changes in the commodity composition of its exports (i.e., shifts towards goods that grow faster than the world average); *c*) due to the changing nature of markets of destination (i.e., shifts towards countries that grow faster than the world average); and *d*) pure competitiveness effects. In effect, the method is based on identities of the following kind. Let

v_i^t and v_i^{t+k} be total Brazilian exports of good i in time periods t and $t+k$;

v_m^t and v_m^{t+k} be total Brazilian exports to country m in the same periods;

v_{im}^t be the value of Brazilian exports of good i to country m in period t ;

r be the rate of change of world exports between t and $t+k$;

r_{im} be the rate of change of world exports of good i to country m between t and $t+k$;

r_m be the rate of change of world exports to country m between t and $t+k$.

For any given period t

$\sum_m v_{im}^t = v_i^t$ is the value of Brazilian exports of good i to all countries, and

$\sum_i v_{im}^t = v_m^t$ is the value of all Brazilian exports to country m .

The total value of Brazilian exports in any period can be written as

$$\sum_i \sum_m v_{im}^t = \sum_i v_i^t = \sum_m v_m^t = V^t$$

52. Extracted from Bonelli and Pinheiro (2006).

If a country exported only one good to a single market (country) and maintained its share in world trade, its exports would grow by $r \times V^t$. Changes over time in its total exports can be expressed as the following identity, obtained by simple manipulation.

$$V^{t+k} - V^t = r \times V^t + (V^{t+k} - V^t - r \times V^t)$$

The term between parentheses shows how much exports have grown in excess of what would be necessary for the country to keep the same world market share. In the case of many goods we have, by analogy, that:

$$v_i^{t+k} - v_i^t = r_i \times v_i^t + (v_i^{t+k} - v_i^t - r_i \times v_i^t)$$

Summing this expression for all i goods we arrive at:

$$\begin{aligned} V^{t+k} - V^t &= \sum_i r_i \times v_i^t + \sum_i (v_i^{t+k} - v_i^t - r_i \times v_i^t) = r \times V^t + \sum_i (r_i - r) \times v_i^t + \\ &+ \sum_i (v_i^{t+k} - v_i^t - r_i \times v_i^t) \end{aligned}$$

The first term on the extreme right hand side represents the effect of total world trade growth; it measures how much Brazilian exports would have to grow to keep up with the world average, that is, to sustain Brazil's share of world trade. The second term refers to the effect stemming from the goods composition of Brazilian exports. It will be positive if its exports are concentrated on goods that recorded a high expansion in world trade. The third is a residual term. A similar expression holds if we partition exports change according to destination countries. Finally, considering both product and destination country we have:

$$v_{im}^{t+k} - v_{im}^t = r_{im} \times v_{im}^t + (v_{im}^{t+k} - v_{im}^t - r_{im} \times v_{im}^t)$$

Summing up over all goods and countries yields the expression used in the CMS decomposition, which breaks total export change down into four effects as shown below:

$$\begin{aligned} V^{t+k} - V^t &= \sum_i \sum_m r_{im} \times v_{im}^t + \sum_i \sum_m (v_{im}^{t+k} - v_{im}^t - r_{im} \times v_{im}^t) \\ &= r \times V^t && \text{world trade growth effect} \\ &+ \sum_i (r_i - r) \times v_i^t && \text{product composition effect} \end{aligned}$$

$$\begin{aligned}
& + \sum_i \sum_m (r_{im} - r_i) \times v_{im}^t && \text{market (distribution) effect} \\
& + \sum_i \sum_m (v_{im}^{t+k} - v_{im}^t - r_{im} \times v_{im}^t) && \text{competitiveness effect}
\end{aligned}$$

A.2 Decomposition of export growth: intensive and extensive margins, price and quantity effects⁵³

Hummels and Klenow (2005) have suggested new methodology to decompose export change in margins that account for the variety of a nation's exports, world trade growth, price margins and destination effects. The extensive margin, which is their measure of diversification, is defined as:

$$EM_m = \frac{\sum_{i \in I_{bm}} p_{mi}^* x_{mi}^*}{\sum_{i \in I} p_{mi}^* x_{mi}^*} = \frac{\sum_{i \in I_{bm}} v_{mi}^*}{\sum_{i \in I} v_{mi}^*}$$

where:

I_{bm} is the set of all goods exported from the given country b to market (country) m ;

I is the set of all goods exported from the Rest of the World (RoW) to market (country) m ;

$v_{mi}^* = p_{mi}^* x_{mi}^*$ is the export value of good i from RoW to market (country) m ;

x_{mi}^* is the quantity of good i exported from RoW to market (country) m ;

$p_{mi}^* = \frac{v_{mi}^*}{x_{mi}^*}$ is the price (average unit value) of good i exported from RoW to market (country) m .

Define dummies d_{mi} such that

$d_{mi} = 1$ if country b (Brazil) exports good i to market m ;

$d_{mi} = 0$ if it does not export good i to market m .

53. This decomposition is an extension of Hummels and Klenow's (2005), who applied their method to cross country data. In our case the formulae have been designed to fit a time series data format.

Using this notation it follows that

$$EM_m = \frac{\sum_{i \in I} d_{mi} v_{mi}^*}{\sum_{i \in I} v_{mi}^*}$$

The intensive margin, which measures the country's market share in the destination market (country) m in which it is present, is defined as:

$$IM_m = \frac{\sum_{i \in I_{bm}} v_{mi}}{\sum_{i \in I_{bm}} v_{mi}^*}$$

where:

$v_{mi} = p_{mi} x_{mi}$ is the value of exports of good i from Brazil to market (country) m ;

x_{mi} is the quantity of exports, good i exported from Brazil to market (country) m ;

$p_{mi} = \frac{v_{mi}}{x_{mi}}$ is the price (unit value) of good i exported from Brazil to market (country) m .

Note that

$$IM_m = \frac{\sum_{i \in I} d_{mi} v_{mi}}{\sum_{i \in I} d_{mi} v_{mi}^*}$$

and:

$$EM_m IM_m = \frac{\sum_{i \in I_{bm}} v_{mi}^*}{\sum_{i \in I} v_{mi}^*} \frac{\sum_{i \in I_{bm}} v_{mi}}{\sum_{i \in I_{bm}} v_{mi}^*} = \frac{\sum_{i \in I_{bm}} v_{mi}}{\sum_{i \in I} v_{mi}^*} = \frac{V_m}{V_m^*}$$

where V_m and V_m^* are, respectively, Brazil and RoW exports to m . It follows from this expression that, given one of the margins, the other one can be easily obtained.

Next we show how the intensive margin can be decomposed into price and quantity effects. First, we define the average relative price of Brazil's exports to market m by the following Sato-Vartia index:⁵⁴

$$P_m = \prod_{i \in I_{bm}} \left(\frac{p_{mi}}{p_{mi}^*} \right)^{w_{mi}}$$

where w_{mi} is the log average of the export share to market m represented by product i from Brazil and RoW, that is:

$$w_{mi} = \frac{\frac{s_{mi} - s_{mi}^*}{\ln(s_{mi}) - \ln(s_{mi}^*)}}{\sum_{k \in I_{bm}} \frac{s_{mk} - s_{mk}^*}{\ln(s_{mk}) - \ln(s_{mk}^*)}}$$

where:

$$s_{mi} = \frac{v_{mi}}{\sum_{k \in I_{bm}} v_{mk}} \quad \text{and} \quad s_{mi}^* = \frac{v_{mi}^*}{\sum_{k \in I_{bm}} v_{mk}^*} \quad \text{are export values shares.}$$

Using the fact that the Sato-Vartia index is an ideal index, the corresponding index for relative quantities can be implicitly obtained as

$$X_m = \frac{MI_m}{P_m}$$

Combining the previous results, we arrive at our final decomposition expression:

$$\frac{1}{k} \ln \left(\frac{V_m^{t+k}}{V_m^t} \right) = \frac{1}{k} \ln \left(\frac{V_m^{*t+k}}{V_m^{*t}} \right) + \frac{1}{k} \ln \left(\frac{P_m^{t+k}}{P_m^t} \right) + \frac{1}{k} \ln \left(\frac{X_m^{t+k}}{X_m^t} \right) + \frac{1}{k} \ln \left(\frac{EM_m^{t+k}}{EM_m^t} \right)$$

This decomposition allows us to decompose the mean log-change of Brazil's exports to country m from t to $t+k$ into:

a) the concomitant log-change in m 's imports (proxied by the growth of RoW exports to m);

b) A component reflecting the log-change in the price margin of Brazil's exports relative to that of exports from the RoW, that can reflect either a higher pricing power or better export a quality;

54. The Sato-Vartia index is a pseudo-superlative, i.e., it gives a second order approximation to the variation in the true price index (defined by a generic utility function). It is also ideal according to Fisher (1922) and exact for a Constant Elasticity of Substitution (CES) aggregation function.

c) a component measuring the log-change in Brazil's share of m 's import market, gauged in quantity terms; and

d) a final term measuring the change in Brazil's export basket, evaluated by the importance of goods exported by Brazil in RoW exports to country m , the extensive margin. Thus, it is a measure of export diversification, which is akin to Rios and Inglesias's (2005) concept of country specific innovations.

Finally, aggregating over markets, it is also possible to decompose the average annual log-change of total exports between two periods using a Divisia-Tornqvist index (measurement errors were found to be minimal in our actual estimates):

$$\begin{aligned} \frac{1}{k} \ln \left(\frac{V^{t+1}}{V^t} \right) \approx \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{V_m^{t+1}}{V_m^t} \right) &= \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{V_m^{*t+1}}{V_m^{*t}} \right) + \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{P_m^{t+1}}{P_m^t} \right) + \\ &+ \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{X_m^{t+1}}{X_m^t} \right) + \frac{1}{k} \sum_m \alpha_m \ln \left(\frac{ME_m^{t+1}}{ME_m^t} \right) \end{aligned}$$

where:

$$\alpha_m = \frac{\alpha_m^t + \alpha_m^{t+1}}{2}$$

APPENDIX A

TABLE A.1
Sector export values from 1975 to 2005
(US\$ million FOB)

Sectors	1975	1980	1985	1990	1995	2000	2005
Agriculture and livestock	1,295	1,102	1,529	1,387	1,336	2,801	6,516
Mineral extraction	1,050	1,801	1,899	2,860	3,068	3,751	9,151
Oil and coal	93	17	1	0	55	159	4,165
Non-metallic minerals	40	154	154	241	481	616	1,053
Steel	163	776	2,064	3,403	4,131	3,526	8,794
Non-ferrous metals	38	128	544	1,510	2,296	2,275	3,376
Other metallurgical	53	274	302	476	770	755	1,585
Machinery, equipment and tractors	188	935	762	1,155	2,370	2,179	6,524
Electrical	133	353	347	802	1,425	1,486	2,832
Electronic equipment and products	155	425	562	642	716	2,241	3,684
Automobiles	222	787	911	950	1,177	2,770	6,859
Auto parts and other vehicles	215	913	1,345	2,314	3,189	6,637	10,657
Wood and furniture products	152	408	330	467	1,397	1,947	4,044
Pulp, paper and printing	76	543	562	1,233	2,732	2,572	3,462
Rubber products	21	115	230	284	578	660	1,087
Chemicals (basic)	52	250	336	584	848	1,042	2,704
Oil refining and petrochemicals	140	598	2,505	1,667	1,812	2,490	6,281
Chemicals, miscellaneous	87	152	197	341	703	761	1,294
Pharmaceuticals and Perfumes	17	76	88	107	291	427	850
Plastics	11	61	158	37	110	132	229
Textiles	416	769	830	1,016	1,197	1,049	1,904
Clothing	88	106	134	134	160	115	179
Footwear and leather products	235	534	1,131	1,482	2,090	2,419	3,500
Coffee	995	2,931	2,836	1,419	2,528	1,784	2,929
Vegetable products, industrialized	303	938	1,501	2,265	2,463	2,124	3,346
Animal production (<i>abate</i>)	166	557	860	648	1,367	1,982	8,082
Dairy products	0	8	7	1	4	13	130
Sugar	1,146	1,372	399	534	1,920	1,199	3,924
Vegetable oils	748	2,216	2,078	2,121	3,214	2,073	4,286
Other food products	129	338	339	393	618	942	1,439
Miscellaneous industries	77	274	452	563	832	1,085	1,264
Non classified	167	220	246	379	630	1,074	2,179
Total	8,670	20,132	25,639	31,414	46,506	55,086	118,308

Source: Funcex.

TABLE A.2

Exports breakdown by industry and destination market

		Partner Union (25)	European States	United States Central America	South and Central America	China	Japan	Russia	Mexico	Australia and New Zealand	Four East Asian traders	India	Africa	World
Agricultural products	2000	7,004	1,905	1,292	529	902	411	101	211	519	87	546	15,465	
	2004	11,610	2,738	1,676	2,734	1,261	1,524	235	135	1,268	308	2,045	30,851	
Food	2000	5,931	1,197	1,117	440	636	411	81	201	402	79	524	12,810	
	2004	10,293	1,804	1,402	2,302	1,018	1,516	210	115	1,062	284	2,008	26,943	
Fuels and mining products	2000	2,121	1,144	736	323	880	0	66	7	248	30	187	6,496	
	2004	3,131	2,408	2,354	1,508	1,032	4	100	10	789	85	412	13,062	
Ores and other minerals	2000	1,453	253	304	286	492	0	50	4	220	23	149	3,817	
	2004	1,932	274	485	1,274	560	4	67	6	405	82	243	6,221	
Fuels	2000	66	529	239	36	0	0	1	0	8	1	24	908	
	2004	591	1,347	1,593	219	0	0	13	0	347	3	136	4,421	
Non-ferrous metals	2000	602	362	193	1	388	0	15	3	20	6	14	1,771	
	2004	608	787	276	15	472	0	20	4	37	0	33	2,420	
Manufactures	2000	6,052	10,088	10,103	232	686	11	1,544	151	873	101	604	31,793	
	2004	9,387	14,733	14,684	1,193	472	130	3,612	273	1,543	258	1,771	50,575	
Iron and steel	2000	712	1,280	541	38	137	0	127	8	364	9	60	3,642	
	2004	950	2,285	1,254	417	142	5	343	9	726	9	237	7,093	
Chemicals	2000	619	639	1,614	48	141	3	81	16	146	15	98	3,565	
	2004	1,009	903	2,524	86	170	31	167	37	186	148	228	5,749	
Pharmaceuticals	2000	37	13	166	3	3	0	27	0	4	1	4	266	
	2004	56	30	223	3	2	1	48	3	3	1	10	395	
Other chemicals	2000	582	626	1,448	45	138	3	54	16	142	14	94	3,299	
	2004	953	873	2,301	83	168	30	119	34	183	147	218	5,354	
Other semi-manufactures	2000	1,175	1,116	1,677	44	45	4	90	39	254	10	127	4,769	
	2004	1,732	2,585	1,903	261	60	19	246	57	362	19	249	7,905	
Machinery and transport equipment	2000	2,862	5,277	4,824	93	289	2	1,185	67	69	54	295	15,531	
	2004	4,550	6,694	7,458	410	48	62	2,676	145	230	70	963	24,191	
Office and telecom equipment	2000	167	899	1,101	9	94	0	63	0	17	1	5	2,373	
	2004	285	646	841	28	4	0	76	1	15	2	58	2,018	
Electronic data processing and office equip.	2000	52	127	302	1	1	0	8	0	1	1	0	493	
	2004	28	77	176	1	3	0	19	0	1	1	20	332	
Telecom equipment	2000	44	714	767	1	92	0	16	0	1	0	1	1,647	
	2004	221	511	639	11	0	0	32	1	7	0	37	1,474	
Integrated circuits and electronic components	2000	71	58	32	7	1	0	39	0	15	0	4	233	
	2004	36	58	26	16	1	0	25	0	7	1	1	212	
Transport equipment	2000	2,102	3,146	2,327	50	171	2	920	14	13	34	167	9,219	
	2004	3,008	4,168	3,897	243	16	49	2,180	83	146	23	597	14,803	
Automotive products	2000	727	772	2,046	11	3	2	865	6	7	25	152	4,682	
	2004	803	1,175	3,607	164	5	28	1,796	67	122	21	537	8,678	
Other transport equip	2000	1,375	2,374	281	39	168	0	55	8	6	9	15	4,537	
	2004	2,205	2,993	290	79	11	21	384	16	24	2	60	6,125	
Other machinery	2000	593	1,232	1,396	34	24	0	202	53	39	19	123	3,939	
	2004	1,257	1,880	2,720	139	28	13	420	61	69	45	308	7,370	
Textiles	2000	114	184	486	0	41	0	14	5	8	1	6	899	
	2004	158	369	583	2	25	1	35	3	10	4	10	1,244	
Clothing	2000	34	100	137	0	4	0	2	0	0	0	1	282	
	2004	92	138	87	0	3	0	6	1	1	0	6	349	
Other manufactures	2000	536	1,492	824	9	29	2	45	16	32	12	17	3,105	
	2004	896	1,759	875	17	24	12	139	21	28	8	78	4,044	

(cont.)

(cont.)

		Partner Union (25)	European States	United States	South and Central America	China	Japan	Russia	Mexico	Australia and New Zealand	Four East Asian traders	India	Africa	World
Personal and household goods	2000	414	1,222	380	0	12	1	15	13	10	0	7	2,125	
	2004	697	1,437	422	4	12	6	89	15	12	2	41	2,861	
Scientific and controlling instruments	2000	24	118	91	1	1	1	7	1	1	4	3	266	
	2004	56	99	107	9	2	5	17	2	4	5	9	338	
Miscellaneous manufactures	2000	98	152	353	8	16	0	23	2	21	8	7	714	
	2004	143	223	346	4	10	1	33	4	12	1	28	845	
Total merchandise	2000	15,266	13,546	12,163	1,084	2,471	422	1,713	371	1,642	218	1,346	55,086	
	2004	24,167	20,319	18,729	5,435	2,765	1,658	3,947	419	3,601	651	4,233	96,475	

Source: WTO statistics.

APPENDIX B

TABLE B.1

Logarithmic decomposition of export growth—1995-1999

(Annual averages, %)

	Mean log- change in exports to each country	Demand pull effect (mean log-change in country imports)	Price mark-up effect	Market-share effect (quantity)	Basket composition (extensive margin)	Weighted contribution	Relative contribution	Country weight
Germany	-0.1	0.0	1.7	-3.4	1.6	-0.01	-1	7
Argentina	7.4	5.6	0.6	1.6	-0.4	0.76	95	10
Australia	-12.0	3.3	-0.9	-8.0	-6.4	-0.07	-9	1
Bolivia	9.0	6.6	8.9	-8.7	2.3	0.04	5	0
Canada	4.9	6.8	-0.1	-2.7	0.9	0.08	11	2
Chile	-5.3	-1.5	2.3	-6.6	0.4	-0.12	-15	2
China	-6.0	5.9	1.0	-13.7	0.8	-0.14	-17	2
Colombia	-1.8	-6.7	2.5	5.4	-3.0	-0.02	-2	1
South Korea	-10.6	-2.9	-0.7	-13.1	6.2	-0.26	-32	2
Ecuador	-17.3	-7.9	-0.5	-5.4	-3.4	-0.05	-6	0
Egypt	12.9	7.6	-2.1	6.2	1.3	0.07	9	1
Spain	4.4	6.7	-0.3	-7.6	5.6	0.11	14	3
United States	5.9	8.0	1.3	-4.2	0.8	1.32	166	22
France	-2.0	1.2	1.1	-6.2	1.9	-0.08	-10	4
Hong Kong	2.4	-2.1	-2.1	5.2	1.3	0.02	3	1
India	6.3	7.8	3.4	-5.1	0.2	0.04	5	1
Indonesia	-6.6	-13.2	0.2	7.6	-1.2	-0.05	26	1
Italy	-1.1	2.0	0.4	-4.8	1.4	-0.05	-6	4
Japan	-9.7	-1.9	-1.9	-1.2	-4.6	-0.67	-85	7
México	17.9	17.4	11.1	-13.4	2.7	0.32	40	2
Norway	14.9	1.0	0.0	16.3	-2.4	0.06	7	0
Netherlands	-0.3	1.5	1.7	-7.6	4.0	-0.01	-1	4
Paraguay	-5.6	-14.7	-5.3	11.6	2.7	-0.07	-9	1
Peru	-8.7	-2.3	-2.6	-3.4	-0.4	-0.07	-8	1
Portugal	6.9	4.4	0.7	-13.9	1.9	-0.07	-8	1
United Kingdom	-0.8	4.7	1.7	-10.3	3.0	-0.03	-3	3
Russia								
Singapore	-8.7	-2.8	-3.4	-2.5	0.0	-0.06	-7	1
Sweden	5.0	2.6	6.4	-12.6	8.6	0.02	3	0
Switzerland	3.5	-0.1	2.4	1.3	-0.1	0.02	2	1
Thailand	-18.1	-8.5	-1.6	-17.3	9.3	-0.14	-18	1
Turkey	-4.3	2.6	1.6	-5.4	-3.2	-0.02	-3	1
Uruguay	-1.7	5.5	-5.9	-2.3	0.9	-0.02	-3	1
Venezuela	2.4	5.8	1.7	-10.0	4.9	0.02	3	1
Belgium-Luxemburg	14.6	2.5	1.6	8.8	1.7	0.32	41	2
Southern African Customs Union (SACU)	-1.6	-2.6	-11.1	14.3	-2.1	-0.01	-1	0
Rest of world	-4.7					-0.41	-51	9
Total	0.8	3.5				0.79	100	
Index round-up error						0.00		

TABLE B.2

Logarithmic decomposition of export growth—1999-2004

(Annual averages, %)

	Mean log-change in exports to each country	Demand pull effect (mean log-change in country imports)	Price mark-up effect	Market-share effect (quantity)	Basket composition (extensive margin)	Weighted contribution	Relative contribution	Country weight
Germany	9.0	8.2	-0.3	-2.1	3.2	0.57	4	6
Argentina	5.7	-5.1	-2.7	14.0	-0.5	0.55	4	10
Australia	12.4	9.0	-0.1	-3.4	6.9	0.05	0	0
Bolivia	13.5	-2.9	-0.6	12.5	4.4	0.07	0	0
Canada	13.5	4.2	2.8	4.0	2.5	0.25	2	2
Chile	20.9	7.8	-0.7	9.9	3.9	0.50	4	2
China	43.9	23.8	-2.8	6.7	16.1	2.41	17	5
Colombia	22.7	8.2	1.8	8.3	4.5	0.25	2	1
South Korea	17.4	11.9	0.0	-5.5	11.0	0.36	3	2
Ecuador	33.1	18.0	-0.6	7.3	8.4	0.11	1	0
Egypt	5.5	-3.8	0.5	-0.4	9.2	0.03	0	1
Spain	11.2	10.8	-2.2	-2.9	5.5	0.29	2	3
United States	12.4	6.8	-2.2	6.4	1.4	2.94	21	24
France	9.9	7.7	-3.5	-1.9	7.5	0.34	2	3
Hong Kong	12.8	8.0	-5.8	4.6	6.0	0.12	1	1
India	16.3	15.3	-3.8	10.7	-5.8	0.12	1	1
Indonesia	6.5	11.0	-1.6	-7.5	4.6	0.04	0	1
Italy	10.5	8.8	-2.5	1.0	3.2	0.39	3	4
Japan	4.6	7.4	1.3	-9.5	5.4	0.21	1	4
México	26.2	5.1	11.4	5.7	3.9	0.88	6	3
Norway	9.6	5.2	0.3	1.6	2.6	0.04	0	0
Netherlands	12.0	7.1	0.0	4.1	0.9	0.40	3	3
Paraguay	8.9	9.8	8.2	-7.6	-1.5	0.09	1	1
Peru	15.9	7.0	-1.8	5.2	5.5	0.10	1	1
Portugal	20.1	5.8	0.2	8.6	5.5	0.19	1	1
United Kingdom	13.1	7.2	-2.5	8.0	0.5	0.39	3	3
Russia	13.1	11.7	1.8	-15.3	14.8	0.19	1	1
Singapore	16.7	7.3	-8.3	10.4	7.3	0.09	1	1
Sweden	15.7	7.1	-1.4	13.7	-3.8	0.09	1	1
Switzerland	1.7	6.2	-2.0	-6.7	4.2	0.01	0	0
Thailand	24.1	12.5	-1.0	8.6	4.1	0.16	1	1
Turkey	18.0	16.8	-1.1	-9.2	11.6	0.09	1	1
Uruguay	0.3	-2.2	0.6	-0.7	2.6	0.00	0	1
Venezuela	19.5	0.0	-1.2	17.3	3.3	0.21	1	1
Belgium-Luxemburg	5.6	10.9	-2.1	-0.6	-2.8	0.13	1	2
SACU	29.8	13.1	4.0	6.1	6.7	0.22	2	1
Rest of World	18.7					1.31	9	7
Total	14.0	9.4				14.20	100	
Index round-up error						0.25		

TABLE B.3

Logarithmic decomposition of export growth—1995-2004

(Annual averages, %)

	Mean log- change in exports to each country	Demand pull effect (mean log- change in country imports)	Price mark-up effect	Market-share effect (quantity)	Basket composition (extensive margin)	Weighted contribution	Relative contribution	Country weight
Germany	4.9	4.5	0.6	-2.7	2.5	0.32	4	6
Argentina	6.4	-0.4	-1.2	8.5	-0.5	0.54	7	8
Australia	1.6	6.5	-0.4	-5.4	1.0	0.01	0	1
Bolivia	11.5	1.3	3.6	3.1	3.4	0.05	1	0
Canada	9.7	5.3	1.5	1.0	1.8	0.17	2	2
Chile	9.2	3.7	0.6	2.6	2.3	0.25	3	3
China	21.7	15.8	-1.1	-2.3	9.3	1.26	15	6
Colombia	11.8	1.5	2.1	7.0	1.2	0.14	2	1
South Korea	5.0	5.3	-0.3	-8.9	8.8	0.13	2	3
Ecuador	10.7	6.5	-0.6	1.6	3.1	0.05	1	0
Egypt	8.8	1.3	-0.6	2.5	5.7	0.04	0	0
Spain	8.2	9.0	-1.4	-5.0	5.6	0.20	2	2
United States	9.5	7.3	-0.6	1.7	1.1	2.04	25	21
France	4.6	4.8	-1.4	-3.8	5.0	0.17	2	4
Hong Kong	8.2	3.6	-4.1	4.9	3.9	0.07	1	1
India	11.9	12.0	-0.6	3.7	-3.2	0.08	1	1
Indonesia	0.7	0.2	-0.8	-0.8	2.0	0.00	0	1
Italy	5.4	5.8	-1.2	-1.6	2.4	0.21	3	4
Japan	-1.8	3.2	-0.1	-5.8	1.0	-0.10	-1	6
México	22.5	10.6	11.3	-2.8	3.4	0.63	8	3
Norway	12.0	3.3	0.2	8.1	0.4	0.04	0	0
Netherlands	6.6	4.6	0.8	-1.1	2.3	0.22	3	3
Paraguay	2.5	-1.1	2.2	1.0	0.4	0.03	0	1
Peru	5.0	2.9	-2.1	1.3	2.9	0.04	0	1
Portugal	8.1	5.2	0.4	-1.4	3.9	0.09	1	1
United Kingdom	6.9	6.1	-0.6	-0.1	1.6	0.21	3	3
Russia								
Singapore	5.4	2.8	-6.1	4.7	4.1	0.04	0	1
Sweden	10.9	5.1	2.1	2.0	1.7	0.06	1	1
Switzerland	2.5	3.4	0.0	-3.1	2.3	0.01	0	0
Thailand	5.4	3.2	-1.3	-2.9	6.4	0.05	1	1
Turkey	8.1	10.5	0.1	-7.5	5.0	0.05	1	1
Uruguay	-0.6	1.2	-2.3	-1.4	1.9	-0.01	0	1
Venezuela	11.9	2.6	0.1	5.1	4.0	0.13	2	1
Belgium-Luxemburg	9.6	7.2	-0.4	3.6	-0.8	0.17	2	2
SACU	15.9	6.1	-2.7	9.7	2.8	0.12	1	1
Rest of world	7.7					0.73	9	9
Total	8.1	6.8				8.20	100	
Index round-up error						0.09		

APPENDIX C

TRADE BARRIERS TO BRAZIL'S AGRICULTURAL EXPORTS

The following report by the OECD, with supporting figures showing ad valorem equivalent (AVE) tariffs paid by Brazil into its five most important overall markets (table 1, appendix A), gives an idea of the barriers faced by Brazilian agricultural exporters:⁵⁵

Soybeans and soybean products. Uncrushed soybeans enter the three principal OECD country markets—the EU, Japan and the United States of America—duty free, while soybean meal (which accounts for more than 2/3 of the value of the products) enters duty free in the EU and Japan, but at a tariff of USD 4.5 per ton (approximately 1.9%) in the United States. By contrast, soybean oil incurs a tariff of 2.9% in the EU (compared with an MFN rate of 6.4%), JPY 13.2 per kg (approximately 21%) in Japan and 19% in the United States (where soybean producers received significant support). The most dynamic markets are outside the OECD area, notably China, which operates a TRQ regime on imports of soybean oil, applying an in-quota tariff of 9% and over quota rate of 31%. This year, this TRQ is supposed to be replaced by a tariff of 9%.

Sugar is among the most distorted of sectors, with the biggest problem being high levels of support provided to producers in the EU and the United States, where domestic prices are 2 to 3 times world market levels. Almost half of Brazil's exports of raw sugar those go to Russia, which operates a specific tariff varying between USD 140 per ton and USD 270 per ton, depending on the average monthly price at the New York Board of Trade. In 2004, the average tariff was USD 200 per ton, corresponding to an ad valorem equivalent of 75%. The EU applies four tariff quota lines for raw sugar. Brazil obtains 28% of the first quota line of 85 000 tons, but nothing under the remaining lines, which total 1.646 million tons. The in-quota tariff rate is EUR 98 per ton, while the average over-quota rate is EUR 373 per ton (corresponding to an AVE of 135%). In addition, special safeguards (SSG) are levied when the “representative price” (i.e. the CIF import price excluding the fixed duty) falls below a “trigger price” of EUR 418/t, which is well above the world price.⁵⁶ In 2005, the United States had a total quota allocation for raw sugar of 1117 million tons, of which 13.7% was destined to Brazil. Brazil does not benefit from Generalized System of Preferences (GSP) status and is levied an in-quota tariff of USD 14.6 per ton, and an over-quota tariff rate of USD 338 per ton on additional exports (of which there are none). In addition, a special safeguard is applied, which may reach up to USD 129 per ton, bringing the total duty to USD 467 per ton.

Nearly all of Brazil's refined sugar exports go to developing countries. China is a potentially important market that applies a TRQ regime under which 70% of the quota is administered by a state trading enterprise. The total quota allocation of 1 945 thousand tons has a fill rate of 67% (thus accounting for about 15% of national

55. This appendix is based on OECD (2005). See Ferreira (2005) for an overview of the producer subsidies in the EU.

56. For 2004-2005, the additional SSG duty was set at EUR 75.6 per ton, which resulted in a total duty of EUR 449 per ton on over-quota exports (implying an AVE of 162%).

consumption). The in-quota tariff is 15% and there are no over quota imports. Brazil currently has a negligible share of the Chinese market. As with raw sugar, the EU and the United States apply varying specific tariffs and tariff-rate quota systems to white sugar, with the result that Brazilian exports into these markets are minimal.

Coffee. Tariffs on coffee exports are generally low, but there is a significant amount of tariff escalation, with higher rates on roasted coffee than on beans, and some countries applying high rate on instant coffee. The three main markets are the EU, the United States and Japan. Unroasted beans enter these markets duty free, but roasted coffee pays a 7.5% tariff into the EU—which contrasts with 0% for African, Caribbean and Pacific countries and 2% for GSP countries—and 10% (the GSP rate) into Japan. Exports into the United States are exempt from tariffs, but their volume is nevertheless reduced by the benefits provided to farmers in Ecuador, Colombia and Peru under the United States' antidrugs initiative. Under a similar program, Canada exempts Colombia, Ecuador, and Mexico from tariffs.

Orange juice. Two thirds of Brazil's exports of orange juice go to the EU, incurring an over-quota tariff of 15%. Exports to the United States would be much higher were it not for the protection afforded to producers in Florida (approximately USD 0.08 per liter, giving an ad valorem equivalent of 62%). The composition of trade is also affected, with the United States charging prohibitive tariffs on imports of fresh oranges. In response to these policies, Brazilian companies have invested heavily in Florida, owning an estimated 40% of the state's processing capacity. There is considerable potential for domestic demand growth, which may offset some of the pressure imposed by high protection.

Meat. In the meat sector, the biggest impediment to export growth is not typically formal trade barriers or subsidies to other competitors, but rather non-tariff barriers in the form of sanitary restrictions. Thus, imports of beef from Brazil are banned in Japan and the United States due to the presence (or alleged presence) of foot and mouth disease. The same is true for pigmeat from Brazil, with the additional claim of swine fever. Brazilian poultry is banned from the United States due to alleged contamination with Newcastle Disease (a claim which Brazil refutes). A further issue is tariff escalation in the beef sector, with processed products (such as corned beef) and by-products (leather) incurring higher tariffs. Most exports of fresh beef go to either Chile, which charges a tariff of 6%, or the EU, which levies a mixed tariff that translates into an AVE of 87%. For Hilton beef, there is a TRQ allocation of 69 100 tons, of which Brazil obtains a 7% allocation. The main markets for frozen beef are the EU, Egypt and Russia. The EU and Russia operate TRQ systems that result in over-quota AVEs of 146% and 60% respectively. A range of Middle Eastern countries are also important, most charging low tariffs. The bulk of processed meat goes to the EU or the United States, where tariffs are 17% and 0.7%. There are relatively high tariffs in potential markets such as China, Japan and Russia.

In the case of poultry, the biggest sub-category is frozen chicken cuts, with the EU and Japan the most important markets. The former employs a TRQ regime through which Brazil has access at multiple tariff rates; the latter applies ad valorem tariffs of 9% and 12% (depending on the cut). Most exports of uncut chicken go to non-OECD countries, with the Middle East the main destination, and Saudi Arabia

the biggest importer. Protection tends to be low in the Middle East, as there are few domestic producers. Virtually all exports of carcass pigmeat go to Russia, which operates a TRQ system under which Brazilian exporters pay an over-quota AVE of 89%. Russia is also the main market for non-carcass pigmeat, with a TRQ system that translates into an AVE tariff of 80% t the margin. Other non-OECD countries impose few tariffs, but sucrose-phosphate synthase (SPS) regulations are still impediment to exports in some cases.

Tobacco. Approximately one half of Brazil's tobacco exports go to the EU and the United States. The EU charges an ad valorem tariff, but with upper and lower bounds set in specific terms. The United States operates a TRQ system under which Brazil obtains a quota of 80 200 tons (just over half the total quota volume). There are few additional exports, given an over-quota tariff rate of 350%.

Cotton. Brazil pays no tariffs on cotton exports to its principal two markets, the EU and Argentina. A four-tier tariff rate quota system is applied in the United States, with Brazil obtaining 280 tons of a total allocation of 20 200 tons under the first line, and nothing under the remaining three lines, which total a further 53 000 tons. Exports to India incur a tariff of 10%, while all exports to China pay the over-quota rate of 40%, which contrasts with an in-quota rate of 1%.

TABLE C.1

Protection by product in Brazil's main agricultural export markets

	Applied tariff in 2004 (ad valorem equivalents, %)					% of exports in 2000-2003				
	European Union	United States	Japan	China	Russia	European Union	United States	Japan	China	Russia
Soybeans	0	0	0	3	0	59	0	4	24	0
Soybean oil	3	19	21	9/31	25	1	0	0	14	0
Soybean meal	0	2	0	5	5	76	0	0	0	0
Raw sugar	35/135	6/128	-	15/50	75	1	2	0	0	48
Refined sugar	93	9/82	43	15/50	78	1	0	0	0	2
Coffee beans	0	0	0	8	5	51	18	9	< 0,04	< 0,04
Roasted coffee	8	0	10	15	10					
Instant coffee	0/9	0	9	17	10	19	11	12	0	21
Frozen orange juice	13/15	62	21 or 26	8	5 or 15	66	17	7	1	0
Uncut frozen chicken	15/30	8	12	15	25	2	0	0	0	11
Cut frozen chicken	0/51	17	9 or 12	12	25	28	0	18	2	11
Fresh beef	20/87	Up to 10/26	39	12	15/60	41	0	0	0	0
Frozen beef	20/146	Up to 10/26	39	12	15/60	28	0	0	0	10
Prepared/preserved beef	17	1	20	12	20	50	31	0	0	0
Carcass	23/45	0	278	12	17/89	0	0	0	0	98
Other beef	0-18/19-35	0	2	12	15/80	5	0	0	0	48
Tobacco	18	9/350	0	10	5	36	13	4	7	6
Cotton	0	Up to 3/24	0	1/40	0	23	1	5	4	0

Source: OECD (2005).

APPENDIX D

THE PROEX AND THE WTO⁵⁷

The Proex equalization program was challenged twice in the WTO. A Panel found that payments on exports of regional aircraft under the Proex interest rate equalization scheme were export subsidies inconsistent with Article 3 of the Agreement on Subsidies and Countervailing Measures (SCM Agreement). The Panel recommended that Brazil withdrew the subsidies within 90 days. In May 1999, Brazil appealed against certain issues of law and legal interpretations developed by the Panel. The Appellate Body upheld the Panel's recommendation. As a result, Brazil restructured Proex's equalization program. Proex II stipulated that the financing of commuter airplanes regarding equalization would be established operation by operation, at levels that could be differentiated preferentially, using as a reference the ten-year U.S. Treasury Bond, with a spread of 0.2% per year. In addition, the Central Bank modified the maximum percentages applicable to interest equalization, which ranged from 1.0 p.p. to 3.8 p.p. in early 1999, to a range of 0.5 p.p. (for a term of up to 6 months) to 2.5 p.p. (for a term of over nine and up to 10 years).

Canada claimed that Brazil did not phase out the subsidy by the scheduled date, and requested that the matter be referred to the original Panel. The Panel noted that the ten-year US Treasury Bond plus 20 basis points established by Brazil as the benchmark in respect of export credits supported by Proex payments was below the relevant Commercial Interest Reference Rate (CIRR). The Panel found that Proex payments in respect of regional aircraft pursuant to the Proex II were subsidies contingent upon export performance, and thus prohibited under the SCM Agreement. The Panel concluded that, in this respect, Brazil had failed to implement the Panel's recommendations. Brazil appealed this decision. The Appellate Body upheld the Panel's conclusion. Canada also requested arbitration for the determination of possible withdrawal of concessions. The Arbitrators decided that compensation covering trade in a maximum amount of C\$ 344.2 million per year would constitute appropriate countermeasures within the meaning of Article 4.10 of the SCM Agreement. To address the recommendations with respect to Proex II, Brazil introduced new reforms to the Proex. Resolution CMN 2,799, of 6 December 2000, redefined once more the criteria for the Proex equalization program (Proex III). Article 1 specifies that financial equalization operations involving exports of aircraft for regional aviation must not result in net interest rates that are lower than the CIRR, as published monthly by the OECD.

In January 2001, Canada asked for permission to apply the countermeasures approved by the DSB and requested a new DSB proceeding for Proex III. The Panel concluded that Proex III, as such, was not inconsistent with the SCM Agreement, since it was legally possible for Brazil to operate the program in such a way that: *a*) would not result in a benefit being conferred on producers of regional aircraft and hence not constitute a subsidy; or *b*) would result in a benefit being conferred, but conform to the interest rates provisions of the Arrangement on Guidelines for

57. This appendix is based on WTO (2004).

Officially Supported Export Credits, which would not constitute a prohibited export subsidy. The Panel noted, however, that it did not necessarily follow from their previous conclusion that future application of the Proex III program would be likewise consistent with the SCM Agreement.