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The Food Industry in Brazil and the United States: The Effects of the FTAA on Trade and Investment

Paulo F. Azevedo
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Special Initiative on Trade and Integration

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C O N T E N T S

THE FOOD INDUSTRY IN BRAZIL AND THE UNITED STATES: THE EFFECTS OF THE FTAA ON TRADE AND INVESTMENT

Paulo F. Azevedo [*]
Fabio R. Chaddad [**]
Elizabeth M.M.Q. Farina [***]

Contents

I. INTRODUCTION

Brazil and the United States are key players in world agricultural and food markets. The agri-food system in both countries is very large in absolute and relative terms. Both are net exporters of agricultural and food products and major recipients of foreign direct investment (FDI) in the food industry. In addition, US food processors hold substantial investment positions abroad. In the 1990s, both countries were actively involved in the formation of regional trade blocs. The United States is a member of the North American Free Trade Agreement (NAFTA), while Brazil is a member of the Southern Common Market (MERCOSUR). More recently, both countries have been engaged in multilateral negotiations that might eventually create a free trade area from Alaska to Patagonia -the Free Trade Area of the Americas (FTAA)-. The aim of this study is to analyze the potential effects of the FTAA on trade and FDI in the Brazilian and US food industries.

To assess the effects of the FTAA on US-Brazilian food industry trade and investment, the study is arranged as follows. The following section provides a general description of the food industry in both countries and examines the industry's size and economic importance relative to the entire food system and the respective national economies. The study then examines industry structure, vertical coordination mechanisms and diversification patterns in selected food industries, including grains, meat, dairy, coffee, sugar and orange juice. It then analyzes bilateral trade flows and barriers to trade in the two counties, focusing on agricultural and food products. The study also examines FDI in the two countries' food industries, including cross-border mergers and acquisitions. It concludes with a brief summary and a discussion of the potential implications of the FTAA for the US and Brazilian food industries.

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II. THE FOOD INDUSTRY IN BRAZIL AND THE UNITED STATES: A GENERAL DESCRIPTION

This section describes and compares the structure of the food industries in Brazil and the United States on the basis of the following variables: number of firms, number of establishments, value of shipments, value added, profitability, employment, geographic scope, and the relative economic importance of alternative forms of organization. The data available in each country, however, are not always perfectly comparable because of different levels of aggregation and the relative lack of publicly available statistical data in Brazil in the same detail as in the United States. When quantitative data are not available, the study uses qualitative evidence to allow for a comparative analysis of the two countries' food industries.

The description of the US food manufacturing industry is based mainly on data collected by the Census of Manufacturers, which is carried out every five years. For the 1990s, comprehensive data are available for the years 1992 and 1997. The 1997 census introduces the North American Industry Classification System (NAICS) rather than the Standard Industrial Classification System (SIC), which poses problems in creating comparable time series for some industries. Additional data are available from the Annual Survey of Manufacturers, the Quarterly Financial Report for Manufacturing, Mining and Trade Corporations, and academic publications. For the analysis of the Brazilian food manufacturing industry, the study uses Annual Industrial Research (PIA) data from the Brazilian Institute of Geography and Statistics (IBGE) and Annual Social Information Report (RAIS) data from the Brazilian Ministry of Labor. The Brazilian Industrial Census, conducted every five years, was discontinued in 1985. It was not until 1996 that IBGE began a new annual industrial data collection effort in the form of the PIA. The latter is not a census but it is the most reliable source of data on industrial activity in Brazil.

Economic Importance of the Food Industry

In terms of value added as a measure of size, the Brazilian food system is about one fifth that of its US counterpart; respectively, they totaled US$156 billion and US$804 billion in 2000. The Brazilian food system's share of gross domestic product (GDP), however, is far greater than in the United States both in terms of employment and value added. The data supporting this general conclusion are discussed below.

The food system is an important part of the US national economy. In 2000, the food system -comprising production agriculture and the whole food marketing system, but excluding agricultural input industries- accounted for 8.1% of US GDP (Table 1) and employed 12% of the US labor force (Harris, *et al*. [2002]). Table 1 also reveals the declining economic importance of the food system relative to the US economy -from almost 31% in 1947 to 8.1% in 2000-. The Brazilian food system, on the other hand, accounts for about 26% of Brazil's GDP (Table 2). As in the United States, the importance of the food system to the Brazilian economy has been declining. Measured in current dollars, the value added by the Brazilian food system fell sharply after the exchange rate devaluation in 1999. In terms of the domestic currency (the real), the value added by the food system in Brazil remained fairly constant in the late 1990s.

TABLE 1
THE CONTRIBUTION OF FOOD MANUFACTURING TO THE US FOOD SYSTEM

Stage of the Food System	1947	1982	1992	2000
	Value Added (US$ billion)			
Agriculture	19.5	71.1	84.4	82.0
Food Processing	11.3	74.1	116.0	165.2
Tobacco Manufacturing	0.6	8.1	24.0	20.0
Transportation	11.6	22.8	25.0	42.9
Wholesale/Retail Trade	22.7	128.6	149.0	337.7
Food Service	6.0	42.6	96.0	156.4
Total Food System	71.7	347.3	494.4	804.2
	Share of Value Added (%)			
Agriculture	27.2	20.5	17.1	10.2
Food Processing	15.8	21.3	23.5	20.5
Tobacco Manufacturing	0.8	2.3	4.9	2.5
Transportation	16.2	6.6	5.1	5.3
Wholesale/Retail Trade	31.7	37.0	30.1	42.0
Food Service	8.4	12.3	19.4	19.4
Total Food System	100.0	100.0	100.0	100.0
Food System/GDP	30.8	11.2	8.2	8.1

Sources: Connor and Schiek [1997], Harris, *et al*. [2002].

TABLE 2
THE CONTRIBUTION OF FOOD MANUFACTURING TO THE BRAZILIAN FOOD SYSTEM

Stage of the Food System	1994	1996	1998	2000
	Value Added (US$ billion)			
Agriculture	46.0	64.0	62.9	46.4
Food and Tobacco Manufacturing*	53.3	74.1	72.8	54.8
Retailing and Food Services	54.5	75.8	74.5	54.9
Total Food System	153.8	213.9	210.2	156.2
GDP	543.1	775.5	787.9	594.2
	Share of Value Added (%)			
Agriculture	29.9	29.9	29.9	29.7
Food and Tobacco Manufacturing*	34.6	34.6	34.6	35.1
Retailing and Food Services	35.4	35.4	35.4	35.2
Total Food System	100.0	100.0	100.0	100.0
Food System/GDP	28.3	27.6	26.7	26.3

Note: * Includes transportation costs incurred by manufacturing firms.
Sources: Furtuoso and Guilhoto [2001], Central Bank of Brazil.

The food processing industry is part of the food system described in Tables 1 and 2. In particular, it is part of the food marketing system, along with transportation, wholesaling, retailing and food

service activities. In 2000, over 80% of the food dollar spent by US consumers went toward value-added services and materials post-farm gate (Harris, *et al*. [2002]). The value added generated by the food processing sector increased from US$11 billion in 1947 to US$165 billion in 2000 (Table 1). US food industry value added represents 20% of the total value added generated by the entire food system, and roughly 2% of GDP.

In contrast to the United States, about 30% of total food expenditures in Brazil are captured by the agricultural sector. The share of the food industry -including tobacco manufacturing and transportation expenses incurred by food processors- is also higher than in the United States, reaching 35% of the total food system and 9.2% of GDP.[1] It is noteworthy that the Brazilian food industry's share of the total food system, unlike in the United States, remained fairly constant in the 1990s. In absolute terms it accounted for US$55 billion in 2000, roughly a third of the value added by US food manufacturing industries in the same year. Although the time period is not long enough to infer a trend, it is interesting to note that the Brazilian retail and food service sectors have undergone deep structural changes but these are not associated with any significant alteration in their respective shares of food system value added (Farina [2002]).

The relative share of each sub-sector of the Brazilian food system in 2000 is comparable to the relative shares observed in the US food system in 1947. Agriculture accounts for little more than a quarter of the whole system; food manufacturing and transportation accounts for about a third; and retailing and food service activities together account for another third. This underscores the different development stages of both countries, but also reflects different domestic food consumption patterns and, particularly, different specialization in international trade flows. Given that Brazil exports a substantial share of its agricultural production in non-processed form (soybean and coffee, for example) or as semi-manufactured products (such as frozen concentrated orange juice, sugar and soybean meal), food processing, retailing and food services do not have the same relevance in the Brazilian food system as in the United States.

As well as comparing the size of the food industry relative to the national economy and the food system, it is also important to compare it relative to the entire manufacturing sector. The manufacturing sector, in general, is crucial to a discussion of international trade and the creation of free trade areas, since its size is usually linked to a country's stage of development. For the purpose of this study, it is important to assess the relative economic importance of food manufacturing as an indicator of how central it will be in multilateral trade negotiations.

Manufacturing is the largest sector in the US economy, currently accounting for about 20% of GDP. Table 3 shows the growth of the US manufacturing sector in terms of the number of establishments, the number of employees, value added and value of shipments. The time series shows modest growth in the number of establishments and a slight fall in employment in the manufacturing sector since the late 1970s. However, value added and value of shipments have increased substantially in nominal terms since 1977, reaching US$2 trillion and US$4 trillion respectively by 1999.

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[1] Note, however, that the data are not directly comparable because of different measurement approaches. The Brazilian value added data do not distinguish between food and tobacco manufacturing. They also include transportation costs incurred by food processors, which are reported separately in the US data.

TABLE 3
SIZE OF THE US MANUFACTURING SECTOR

Year	Number of Establishments*	Number of Employees	Value Added (US$ billion)	Value of Shipments (US$ billion)
1999	n.a.	16,711,088	1,967.81	4,043.28
1998	n.a.	16,944,977	1,891.27	3,899.81
1997	362,829	16,805,127	1,825.69	3,834.70
1996	n.a.	17,326,300	1,749.66	3,715.43
1995	n.a.	17,419,200	1,711.44	3,594.36
1994	n.a.	17,059,400	1,605.98	3,348.02
1993	n.a.	16,943,500	1,483.05	3,127.62
1992	370,912	16,948,900	1,424.70	3,004.72
1991	n.a.	16,792,800	1,341.39	2,878.16
1990	n.a.	17,579,400	1,346.97	2,912.23
1989	n.a.	17,794,800	1,325.43	2,840.38
1988	n.a.	17,917,500	1,269.31	2,695.43
1987	358,952	17,718,000	1,165.74	2,475.94
1986	n.a.	17,086,800	1,035.44	2,260.31
1985	n.a.	17,508,300	1,000.14	2,280.18
1984	n.a.	17,854,900	983.23	2,253.43
1983	n.a.	17,453,100	882.01	2,045.85
1982	348,385	17,818,100	824.12	1,960.21
1981	n.a.	18,919,800	837.51	2,017.54
1980	n.a.	19,311,400	773.83	1,852.67
1979	n.a.	19,756,500	747.48	1,727.21
1978	n.a.	19,239,400	657.41	1,522.94
1977	350,757	18,515,900	585.17	1,358.53

Note: * Only available in Economic Census years.
Source: 1997 Census of Manufacturers and Annual Survey of Manufacturers.

On the basis of the NAICS system, the food processing industry is the fourth largest manufacturing industry group in terms of value added (Table 4). It generated US$164 billion in value added in 1997, equivalent to 9% of total manufacturing value added. In addition, food manufacturers employ 9% of workers and generate 11% of the total value of shipments in the manufacturing sector. Because of the United States' mature domestic food market, however, the value of US food processing shipments grew less than 3% annually from 1995 to 1999 (Harris, *et al*. [2002]).

Food manufacturing industry activity in Brazil accounts for a higher share of total manufacturing activity than in the United States. There are about 20,000 food manufacturing firms in Brazil, equivalent to 16% of the total number of manufacturing companies (Table 5). The food industry's share is even more significant in terms of employment, accounting for 19% of the total number of workers employed in the manufacturing sector, with almost 1 million employees.

Brazilian industrial activity reflects the influence of the macroeconomic stability achieved with the 1994 Real Plan and the subsequent currency devaluation in 1999. Total employment -in both the food industry and the manufacturing sector as a whole- systematically decreased in the post-

Real Plan period, when the exchange rate was highly overvalued. Following the devaluation in January 1999, domestic industrial production became more competitive. As a result, food industry employment increased sharply and in 2000 it was 8.2% higher than in 1996. Similarly, the rate of growth of the value of shipments, in terms of the domestic currency, increased after the exchange rate devaluation. Interestingly, food industry shipment values increased even in the years when the real was overvalued. This is characteristic of the restructuring of Brazilian industry that took place in the 1990s: output growth accompanied by declines in employment levels (Moreira [2000]).

TABLE 4
THE SIZE OF US MANUFACTURING INDUSTRIES, RANKED BY VALUE ADDED, 1997

NAICS Code	NAICS Industry Group*	Number of Companies	Number of Establishments	Number of Employees	Value Added (US$ billion)	Value of Shipments (US$ billion)
334	Computer and electronic product manufacturing	15,492	17,435	1,691,146	252.63	439.38
336	Transportation equipment manufacturing	10,979	12,887	1,842,315	227.51	575.31
325	Chemical manufacturing	9,626	13,474	882,645	224.68	415.62
311	**Food manufacturing**	**21,958**	**26,302**	**1,466,956**	**163.68**	**421.74**
333	Machinery manufacturing	27,983	30,599	1,420,512	137.93	270.69
332	Fabricated metal product manufacturing	58,516	62,384	1,763,772	133.49	242.81
326	Plastics and rubber products manufacturing	13,798	16,821	1,023,060	81.35	159.16
322	Paper manufacturing	3,808	5,868	574,274	70.30	150.30
331	Primary metal manufacturing	4,076	5,059	605,085	68.75	168.12
339	Miscellaneous manufacturing	30,335	31,476	725,396	61.45	99.73
323	Printing and related support activities	40,987	42,863	834,404	58.39	97.49
335	Electrical equipments, appliances and components	5,839	6,930	593,802	57.22	112.12
312	Beverage and tobacco manufacturing	2,239	2,727	175,711	56.43	96.97
327	Nonmetallic mineral product manufacturing	11,921	16,310	501,471	49.43	86.46
324	Petroleum and coal products manufacturing	1,166	2,146	107,625	37.61	177.39
337	Furniture and related product manufacturing	19,838	20,738	603,668	34.84	64.30
315	Apparel manufacturing	15,839	16,989	710,796	33.78	68.02
321	Wood product manufacturing	15,621	17,367	570,034	33.49	88.47
313	Textile mills	3,863	4,694	391,899	23.70	58.71
314	Textile product mills	7,516	7,899	235,441	13.61	31.05
316	Leather and allied product manufacturing	1,727	1,861	85,115	5.41	10.88
	Manufacturing Total	*316,952*	*362,829*	*16,805,127*	*1,825.69*	*3,834.70*

Note: * Industries ranked by value added.
Source: 1997 Census of Manufacturers.

TABLE 5
THE FOOD MANUFACTURING INDUSTRY IN BRAZIL, 1996-2000

	Number of Firms			Employment			Value of Shipments (US$ billion)			Value Added (US$ billion)		
	Manufacturing Total	Food Industry	Share (%)	Manufacturing Total	Food Industry	Share (%)	Manufacturing Total	Food Industry	Share (%)	Manufacturing Total	Food Industry	Share (%)
1996	105,865	17,391	16.4	4,937,721	902,542	18.3	343.32	69.612	20.3	153.23	27.74	18.1
1997	104,363	17,351	16.6	4,803,644	886,329	18.5	353.25	71.63	20.3	155.63	29.54	19.0
1998	110,631	18,614	16.8	4,689,225	880,504	18.8	332.16	68.82	20.7	143.52	26.71	18.6
1999	115,069	19,594	17.0	4,912,634	929,706	18.9	259.01	52.63	20.3	112.05	18.87	16.8
2000	121,967	19,737	16.2	5,227,720	976,783	18.7	317.37	58.27	18.4	136.22	19.57	14.4

Source: Annual Industrial Research (PIA), Brazilian Institute of Geography and Statistics (IBGE).

Although there are several similarities between food manufacturing and the other manufacturing industries in Brazil, value added data reveal some important distinctions. The first is the relatively low value added observed in food manufacturing. Whereas the food industry share accounts for 14% of total manufacturing value added in Brazil, its share relative to employment and value of shipments exceeds 18%. Another important distinction between food manufacturing in Brazil and the United States concerns employment shares, respectively 18.5% and 8.7% in 1997. This difference reflects the economic importance of food manufacturing relative to the respective domestic manufacturing sectors, but also the technological level, particularly as regards the adoption of labor-saving technologies. Value added per employee is US$111,000 in the United States compared to US$20,000 in Brazil. Differences in the adoption of labor-saving technologies between the two countries stem from technology availability and relative prices, as wages tend to be lower in Brazil. Although several different technologies coexist, Brazilian food manufacturers in general employ natural resources and labor more intensively (Moreira and Najberg [1998]).

The Size of the Food Processing Industries

The NAICS system distinguishes between nine food industry groups (by 4-digit codes) in the US food processing industry. Table 6 ranks these nine groups by value added. Meat product manufacturing is the largest, with value added of US$30 billion in 1997. Bakeries and tortilla manufacturing is the second largest, with US$27 billion in value added. Other large food industry groups in terms of value added include fruit and vegetable preserving, dairy product manufacturing, and grain and oilseed milling.

TABLE 6
US FOOD PROCESSING INDUSTRY GROUPS RANKED BY VALUE ADDED, 1997

NAICS Code	NAICS Description	Number of Companies	Number of Establishments	Number of Employees	Value Added (US$ billion)	Value of Shipments (US$ billion)	VA/VS (%)
3116	Meat product manufacturing	2,794	3,397	464,991	30.17	112.98	26.71
3118	Bakeries and tortilla manufacturing	10,437	11,246	298,300	27.16	43.72	62.12
3119	Other food manufacturing	2,493	2,882	148,688	26.32	48.91	53.83
3114	Fruit and vegetable preserving and specialty food manufacturing	1,394	1,780	191,576	23.36	46.62	50.11
3115	Dairy product manufacturing	1,329	1,830	131,868	17.62	58.67	30.04
3112	Grain and oilseed milling	534	891	59,243	15.87	52.08	30.47
3113	Sugar and confectionery product manufacturing	1,556	1,741	84,876	11.88	24.11	49.25
3111	Animal food manufacturing	1,077	1,696	46,651	8.78	27.73	31.66
3117	Seafood product preparation and packaging	731	839	40,763	2.51	6.92	36.31
311	**Total Food Manufacturing**	**22,345**	**26,302**	**1,466,956**	**163.68**	**421.74**	**38.81**
3121	Beverage manufacturing	2,169	2,622	142,117	29.74	60.90	48.84
3122	Tobacco manufacturing	70	105	33,594	26.69	36.08	73.99
312	**Beverage and Tobacco Product Manufacturing**	**2,239**	**2,727**	**175,711**	**56.43**	**96.97**	**58.20**

Source: 1997 Census of Manufacturers.

Table 6 also shows the ratio of value added relative to value of shipments (VA/VS). Ratios across food industry groups varied considerably in 1997. Most of the meat, dairy, animal feed, and grain and oilseed milling industries have ratios of around 30%, since their raw materials costs are higher relative to finished good prices. There are higher ratios in industries with highly processed and differentiated food products, such as bakery goods and fruit and vegetable preserving. Beverage and tobacco manufacturing also have 50%-plus ratios, largely because of intense advertising and high marketing expenses.

Table 7 ranks the Brazilian food industry groups by value of shipment. Dairy processing is the largest group, followed by coffee and grain milling. The composition of the Brazilian food industry partially explains the aforementioned low value added in comparison to the United States.

TABLE 7
BRAZILIAN FOOD PROCESSING INDUSTRY GROUPS RANKED BY VALUE OF SHIPMENTS, 2001

Description	**Value of Shipments** (US$ billion)
Dairy products	7.31
Coffee roasting and grain milling	6.46
Meat product manufacturing	6.12
Fats and oils	5.32
Wheat products	4.42
Sugar	3.96
Processed fruits and vegetables	2.85
Chocolates and confectionary	1.49
Fish processing	0.43
Others	2.72
Total Food Manufacturing	*41.08*

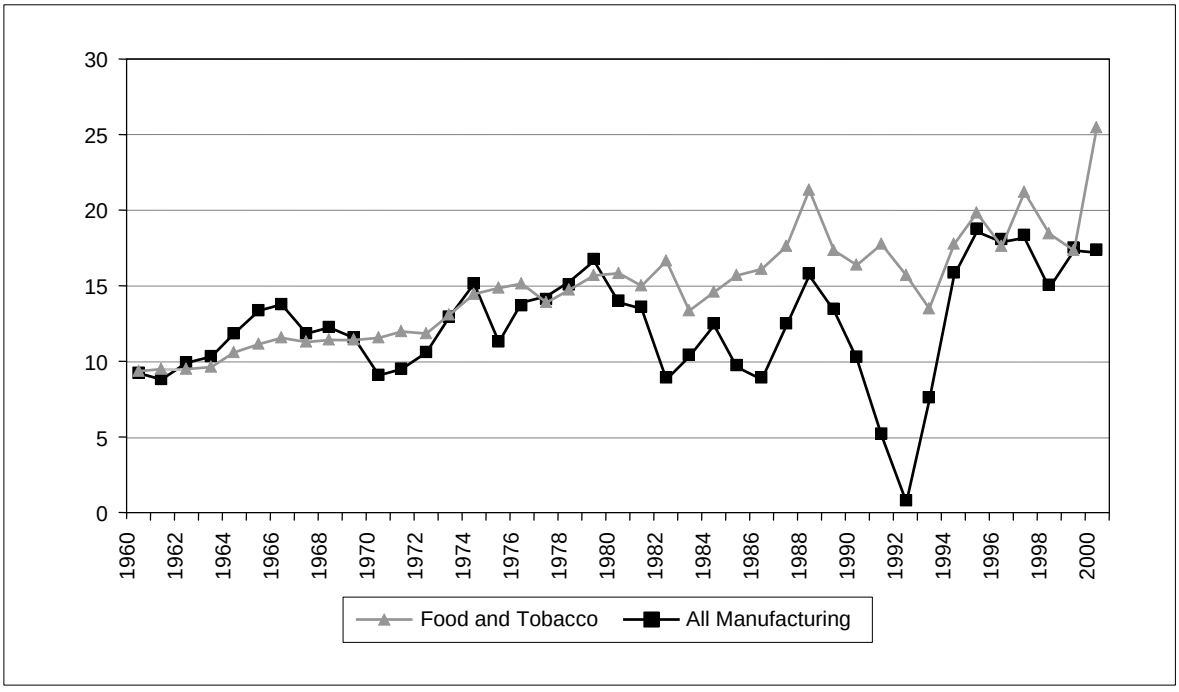
Source: ABIA [2002].

Profitability

The ratio of after-tax profits to shareholders' equity is a measure of financial performance commonly used by economists as an indicator of industry profitability and returns to investors. Brazil and the United States differ markedly with regard to food manufacturing firms' reported profitability. The first distinction is the level of annual rate of after-tax profit to shareholder equity, which is much higher in the United States on average. This may be due to real differences in food companies' performance, but is more likely due to accounting data reporting biases, since firms in Brazil have strong incentives to underestimate profits. In contrast to US firms, Brazilian food processors in general are privately-owned corporations, since equity markets in Brazil are less developed. The second distinction, which is less sensitive to problems of data reliability, is the above-average profitability of US food manufacturers relative to firms in other industries, whereas Brazilian food processors under-perform compared to the median profitability ratio evident in other manufacturing sectors.

Figure 1 shows the evolution of annual profitability ratios of food processors and all other manufacturers in the United States for the period 1960-2000. The graph reveals an upward trend in food industry profitability from 10%-15% between 1960 and 1980 to 15%-25% thereafter. Whereas food industry profit ratios closely followed all manufacturing profits until the early 1980s, the industry has consistently outperformed other manufacturing industries since 1982. Moreover, food processors' returns to investors are considerably less volatile, especially during recession years. The high level of profits and relative stability of shareholders' returns contributes to the attractiveness of food processors to investors' portfolios.

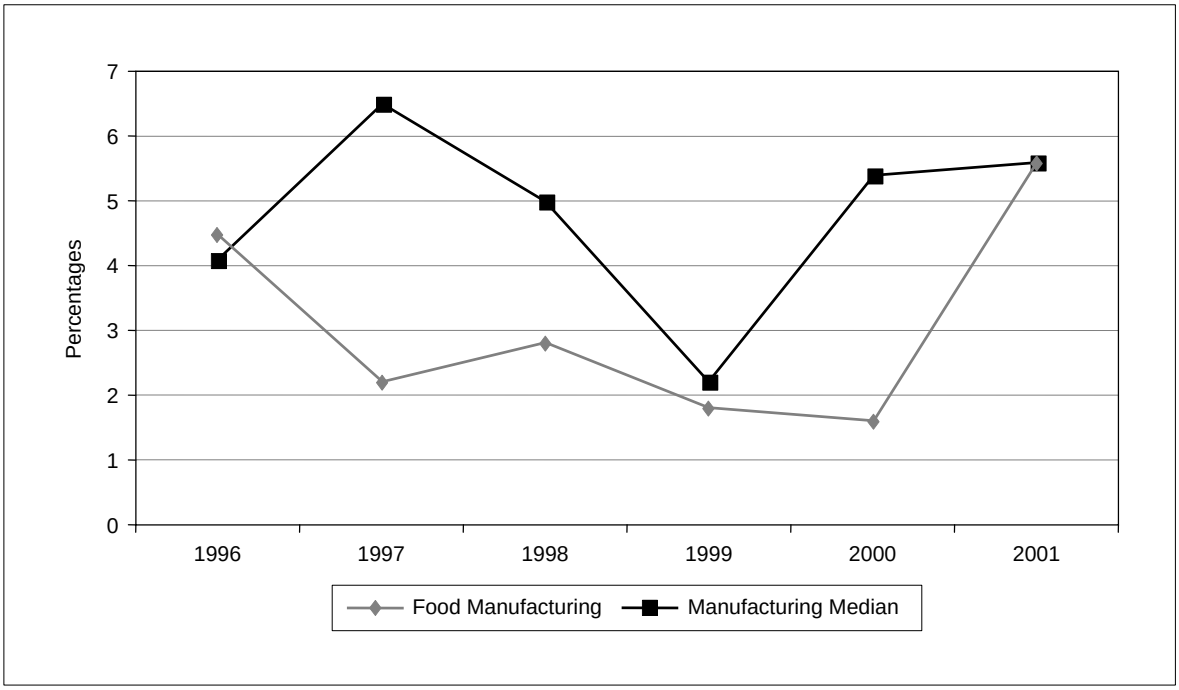
FIGURE 1
ANNUAL RATE OF AFTER-TAX PROFIT ON EQUITY IN THE UNITED STATES (1960-2000)



Source: Quarterly Financial Report for Manufacturing, Mining and Trade Corporations.

In contrast, food processors in Brazil have performed poorly in comparison to other manufacturing firms (Figure 2). Since 1997, the profitability of food manufacturing firms has been systematically below the median of all manufacturing industries, except in 2001. Even after the devaluation of the real, food industry profitability declined in 1999 and 2000. This is partially attributable to depressed prices for important agricultural commodities -such as soybean, coffee and sugar- in Brazil. The subsequent recovery of agricultural prices is the main reason for the improvement of food industry profitability evident in 2001. In addition to low agricultural prices, real food prices in Brazil fell by almost 30% from 1994 to 2001.

FIGURE 2
ANNUAL RATE OF AFTER-TAX PROFIT ON EQUITY IN BRAZIL



Source: Exame Melhores e Maiores.

Geographic Location of Food Manufacturing Industries

Location is an important variable for competitiveness analysis because it is a significant determinant of raw material costs, wages, availability of skilled labor, access to infrastructure, transportation costs and appropriation of agglomeration economies (Dunning [1996]; Porter [1998]). To examine the location of US and Brazilian food processing firms, this study uses selected statistics by state or region. In the Brazilian case, it also addresses the intense industrial relocation activity that took place throughout the 1990s and its potential impact on food industry competitiveness in Brazil and the United States.

Table 8 shows selected food industry statistics by state and ranks the leading 25 US states according to the number of food processing establishments. Although food industry establishments are located in all 50 US states, about 40% of them are in five states (California, New York, Texas, Pennsylvania and Illinois). In addition, these five states employ 30% of all food industry workers and generate 31% of the total value of food industry shipments.

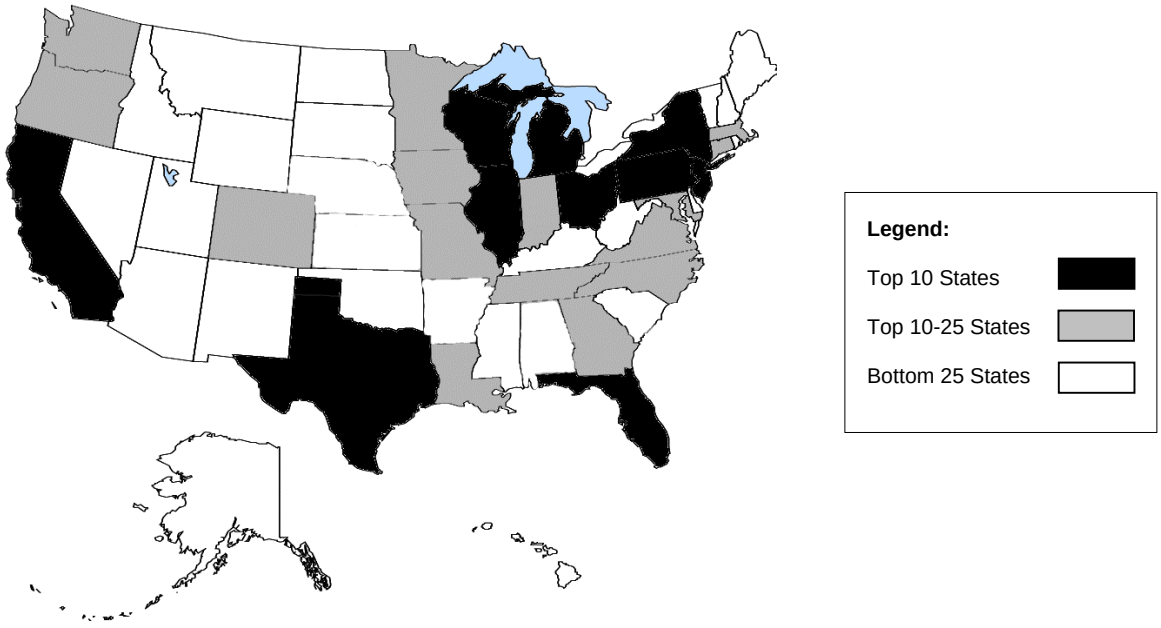
Figure 3 illustrates the current geographic location of food processing establishments in more detail on the basis of food processing establishments ranked in Table 8. Food processing plants are concentrated in high population states such as California, New York and Texas, and in states with significant agricultural activity such as California, Illinois, Iowa and Wisconsin. California has the most food processing establishments, since it has several large population centers and also is the country's leading agricultural producer.

TABLE 8
TOP FOOD INDUSTRY STATES IN THE UNITED STATES
RANKED BY NUMBER OF ESTABLISHMENTS, 1997

State	Number of Establishments	Number of Employees	Payroll (US$ billion)	Value of Shipments (US$ billion)
California	3,499	154,473	4.250	39.975
New York	2,198	49,103	1.377	13.718
Texas	1,562	83,716	2.101	26.313
Pennsylvania	1,368	75,758	2.274	20.374
Illinois	1,300	84,578	2.598	29.267
New Jersey	1,035	29,339	0.939	7.889
Wisconsin	994	62,249	1.679	20.597
Florida	946	36,948	0.995	10.539
Ohio	936	48,624	1.469	17.869
Michigan	863	35,477	1.041	10.624
Massachusetts	755	21,074	0.586	4.581
Washington	734	36,066	0.947	8.693
Minnesota	657	44,042	1.219	14.807
Georgia	527	60,320	1.402	15.346
North Carolina	501	52,940	1.212	11.635
Missouri	496	39,886	0.964	13.107
Indiana	446	33,062	0.968	10.621
Iowa	441	44,956	1.265	21.376
Oregon	440	21,567	0.547	4.662
Virginia	436	33,703	0.784	9.334
Louisiana	401	15,918	0.403	4.938
Colorado	382	18,096	0.447	5.518
Maryland	361	17,479	0.453	5.911
Tennessee	338	35,817	1.005	9.503
Connecticut	315	8,068	0.238	1.858
Other 25 States Combined	**4,430**	**327,791**	**7.368**	**84.924**
US Total	*26,361*	*1,471,050*	*38.500*	*424.000*

Source: US Bureau of the Census, 1997 Economic Census.

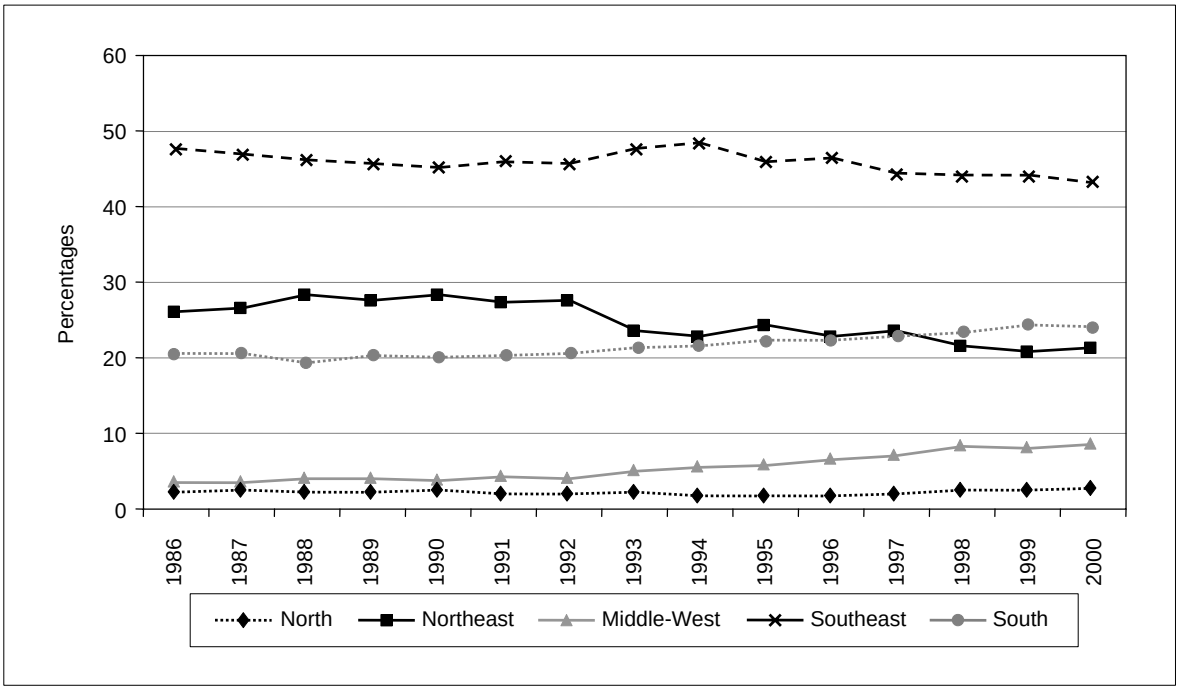
FIGURE 3
LEADING STATES IN NUMBER OF FOOD PROCESSING ESTABLISHMENTS
IN THE UNITED STATES, 1997



Geographically more concentrated than in the United States, the Brazilian food industry is located mainly in the Southeast, the country's most populous region and the one with the highest *per capita* income. Despite this geographic concentration, the food industry plays an important economic role in Brazil's less developed regions, particularly the Northeast and the Middle-West. Moreover, the pattern of food industry relocation favors these less developed regions and contributes to the deconcentration of industrial activity in Brazil.

The analysis of the Brazilian food industry's geographic location is based on state-level employment data collected by the Brazilian Labor Ministry. Figure 4 shows that the Southeast region accounts for almost half of total food industry employment. Geographic concentration is even higher when proxied by payroll, as the Southeast's share of the national total increases to almost 60%. The state of São Paulo alone accounts for more than half of food industry employment and payroll in the Southeast.

FIGURE 4
GEOGRAPHIC DISTRIBUTION OF FOOD INDUSTRY EMPLOYMENT



Source: Brazilian Ministry of Labor.

Figure 4 also shows an initial trend of geographic deconcentration until the 1990s, with a fall in the Southeast's share. In the early 1990s the Brazilian economy was exposed to a competition shock as a result of trade liberalization, deregulation and privatization policies, which eroded the competitiveness of certain industrial sectors and regions. Consequently, many non-competitive firms and jobs were lost, mainly in the Northeastern and Northern regions (Azevedo and Toneto [2001]). The increase in the Southeast's share of employment in that period thus stems from a relatively lesser decline in the number of plants and employees. The second half of the 1990s again brought geographic de-concentration, with a consistent fall in the Southeast's share and

concomitant increases in the Middle-West's and South's shares of food industry employment. Employment growth in the industry has been remarkable in the Middle-West region, whose share rose from 3.5% in 1986 to 8.6% in 2000, an average annual growth rate of 6.6%.

Connor and Schiek [1997] provide a useful categorization of food industries to explain the location of food processing establishments in the United States. Three locational types are identified: supply-oriented, demand-oriented and "footloose" industries. The authors classify 22 food industries in the United States as supply-oriented because agricultural input costs are large relative to total production costs. On average, 52% of supply-oriented food processing costs stem from expenditures on agricultural inputs. In addition, an industry tends to be supply-oriented when it processes perishable agricultural inputs such as seafood, dairy goods, and fruits and vegetables. Consequently, supply-oriented industries tend to locate close to sources of agricultural commodities, such as in California, the Corn Belt and the Upper Midwest.

The second type of food industry is labeled demand-oriented because finished product distribution costs comprise a high share of the final product price. As a result, demand-oriented food industries tend to locate processing establishments near population centers, for example along the US east and west coasts. Connor and Schiek also identify "footloose" industries with neither high input costs nor high product shipping costs dictating the location decision. Footloose industries tend to locate manufacturing plants around other established manufacturing industries because of agglomeration economies, tax incentives or access to skilled human resources. This helps explain the large number of food processing establishments in New Jersey, New York and Pennsylvania, which form the traditional US industrial belt.

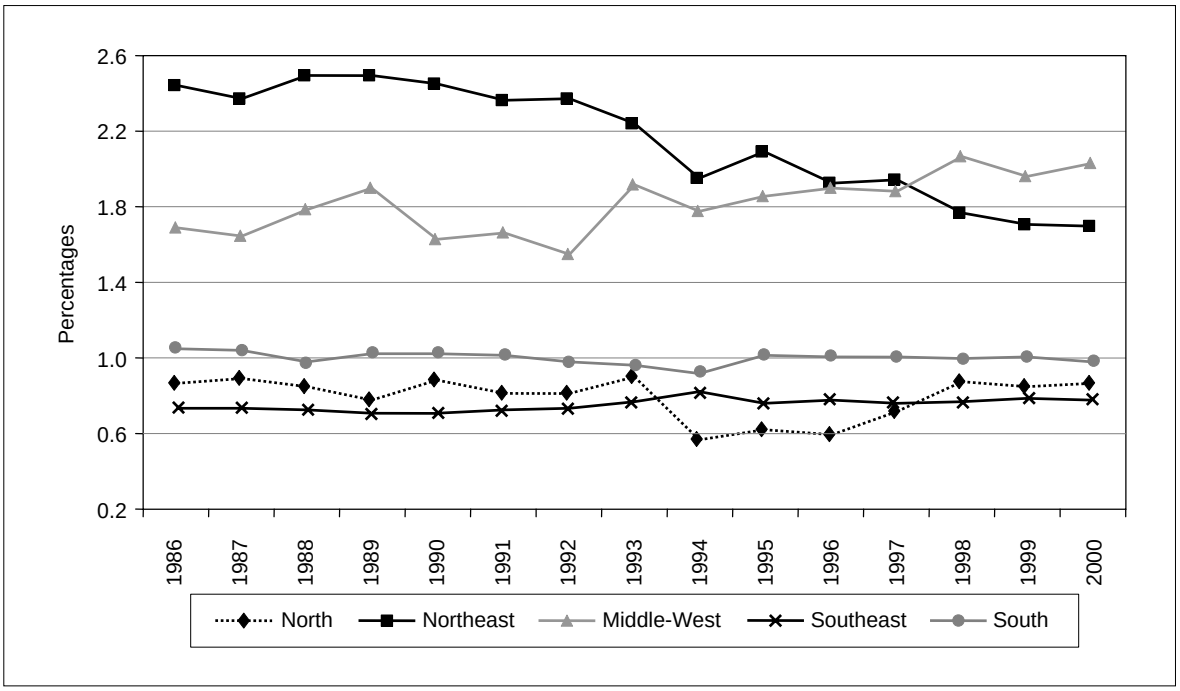
Connor and Schiek's classification also informs the analysis of food industry location in Brazil. The extremely high concentration of food processing establishments in Southeastern Brazil, mainly in São Paulo State, is explained by the concurrence in that region of food consumption (demand-oriented), agricultural production (supply-oriented) and the most complex agglomeration of industrial activity. The Southeast is home to 35% of the Brazilian population, more than half of the country's industrial activity, and also specialized service sectors. The recent relocation of food industry plants to the Middle-West springs from supply-oriented industries following the growth of agricultural production in the Brazilian "*cerrados*". In addition, demand-oriented firms focusing on the growing Northern and Middle-Western markets are also relocating to the *cerrado* region.

Despite its concentration in Southeastern Brazil, the food industry plays a vital economic role in other regions. To identify the regional relevance of the food industry and show how the observed relocation patterns may affect its competitiveness, Figure 5 presents regional specialization indices measuring the level of intensification of food processing activities. The index expresses the relative economic importance of the food industry to a region in comparison to its importance to the whole country. If the index is greater than one, the region is relatively specialized in food processing. Figure 5 reveals two regions specialized in food processing, the Northeast and the Middle-West. In the North and, surprisingly, the Southeast, the food industry is relatively less important than other industrial sectors.

Figure 5 also shows a clear trend of food industry relocation and increased specialization in relatively more competitive regions, particularly the Middle-West. Not only is the Middle-West specialized in food processing, but its specialization index grew during the 1990s. As a result, the

region now has the highest specialization index in food industry activity, surpassing the Northeast in 1996. The Northeast region, although still specialized in food processing, has become less food industry-dependent following trade liberalization and industry deregulation in the early 1990s. In sum, notwithstanding food industry concentration in the Southeast, the most dynamic and more specialized region in food processing is the Middle-West. As the region further develops its infrastructure and transportation systems, this relocation will probably increase the Brazilian food industry's competitiveness, with direct consequences for how Brazilian and US firms react to the FTAA.

FIGURE 5
REGIONAL SPECIALIZATION INDEX



Source: Brazilian Ministry of Labor.

Business Organization

Business organization is an important determinant of firms' strategic behavior, particularly as regards decisions about international trade and FDI. Large corporate firms are more likely to be exporters, to participate in joint ventures in foreign markets, and to expand internationally (Chesnais [1996]; Dunning [1998]; Hamming and Kannebley [2003]). As to business organization, food processing industries in the United States and Brazil are quite different. To analyze these differences, this study uses data on different types of company ownership in the United States and multinational firms' share of food production and employment in Brazil. It also compares the size and business structure of the largest food companies in both countries.

Table 9 shows selected US food industry statistics for different types of company ownership structure in 1997. The data reveal that the corporate form of ownership dominates the US food

industry: 15,000 food companies are organized as corporations, which is equivalent to almost 70% of all 22,000 food manufacturing companies. A minority of food manufacturing firms are organized in non-corporate ways, including sole proprietorships (21%), partnerships (6%) and other non-corporate entities (3%). Sole proprietorships are owned and operated by a single entrepreneur and tend to be small. Sole proprietorship food firms generate average annual sales of US$760,000 and employ on average six workers. Partnerships are voluntary associations of two or more entrepreneurs who combine resources in a jointly-managed enterprise. They tend to be larger than sole proprietorships -with average annual sales of US$7 million and 27 employees-.

TABLE 9
US FOOD INDUSTRY STATISTICS BY COMPANY OWNERSHIP STRUCTURE, 1997

Ownership Structure	Number of Companies	Share (%)	Number of Employees	Share (%)	Value of Shipments (US$ billion)	Share (%)
Corporations	15,135	68.9	1,309,912	89.3	378.94	89.9
Sole proprietorships	4,705	21.4	26,499	1.8	3.59	0.9
Partnerships	1,436	6.5	39,145	2.7	9.98	2.4
Other non-corporate forms	682	3.1	91,400	6.2	29.23	6.9
All Establishments	21,958	100.0	1,466,956	100.0	421.74	100.0

Source: US Bureau of the Census, 1997 Census of Manufacturers.

US food manufacturing corporations employ 1.3 million workers and generate about US$380 billion in sales. In other words, food corporations are responsible for about 90% of the food industry's employment and total value of shipments. Food corporations tend to be larger than non-corporate food companies, with average annual sales of US$25 million and average employment of 87 workers per firm. This characteristic is also apparent in the Brazilian food industry, where corporations, particularly multinationals, comprise most of the largest food companies. Unlike US food processors, which tend to be publicly traded corporations, in general Brazilian food companies are privately owned. Privately held food companies in Brazil are owned by multinational corporations, diversified domestic conglomerates or family businesses.

The biggest companies in the food industry are very large, both in absolute terms and relative to others. According to Rogers ([2001] p. 5), "the sector is best described by a big-small model, where extremely large firms control leading positions in most markets, and smaller companies, including startups, operate in a competitive fringe trying to serve a particular market niche or develop a new idea". Table 10 shows the largest food processors in the United States in 2001, ranked by annual revenues.

The great majority of the largest food companies shown in Table 10 are publicly-owned corporations based in the United States. Cargill, the largest agribusiness in the world, is a privately-owned corporation. Large US food processors are multinational in scope, holding substantial foreign asset investments. According to Connor and Schiek [1997], over 12% of total food processors' assets are located abroad. Additionally, over 20% of US food companies' sales are in international markets. This is the case of Cargill and Kraft Foods, which are among the top 10 food companies in Brazil. The fact that US food corporations are becoming increasingly global is not surprising, since domestic food consumption growth is low, a characteristic of a mature market.

TABLE 10
REVENUES OF TOP 30 FOOD PROCESSING COMPANIES IN THE UNITED STATES, 2001

Rank	Company	**Revenues** (US$ million)
1	Cargill	49,204
2	Kraft Foods	33,875
3	ConAgra	27,194
4	Archer Daniels Midland	20,051
5	Sara Lee	17,747
6	Unilever Best Foods (1)	12,400
7	Farmland Industries *	11,763
8	Nestle USA (2)	11,100
9	Tyson Foods	10,751
10	H.J. Heinz	9,430
11	Kellogg	8,853
12	Dairy Farmers of America *	7,999
13	CHS Cooperatives *	7,875
14	General Mills	7,078
15	Campbell Soup	6,664
16	Dean Foods	6,230
17	Land O'Lakes *	5,973
18	Smithfield Foods	5,900
19	Dole Food	4,688
20	Hershey Foods	4,557
21	Procter and Gamble (3)	4,140
22	Hormel Foods	4,124
23	Interstate Bakeries	3,497
24	Earthgrains	2,582
25	William Wrigley Jr.	2,430
26	McCormick	2,372
27	Chiquita Brands International	2,242
28	California Dairies *	2,242
29	Pilgrim's Pride	2,215
30	Corn Products International	1,887
	Average Revenue	*9,902*

Notes: * Farmer-owned cooperatives.
(1) US food division of Unilever plc, a British-Dutch multinational with US$46.7 billion in total revenues.
(2) US division of Nestle S.A., a Swiss food company with annual sales of US$57.2 billion.
(3) Food division of Procter and Gamble Co., a consumer products company with US$39.2 billion in sales.
Source: The 2002 Fortune 500 and Company Annual Reports.

Table 10 also shows that only two of the leading 30 food manufacturing firms are multinational corporations based in other countries: Unilever (United Kingdom) and Nestlé (Switzerland). Foreign companies own less than 10% of total US food processing assets. In addition, foreign firms control approximately 12% of US food sales. Food imports generate about a third of that market share and the remaining two thirds come through sales of US subsidiaries controlled by foreign multinational companies (Connor and Schiek [1997]).

The same pattern of coexistence of very large firms and smaller ones competing in a competitive fringe -the "big-small model"- is also found in Brazil. Notwithstanding this similarity, food companies in Brazil tend to be much smaller in absolute and even relative terms than US food processors. Whereas the size of the US food processing industry is four times greater than in Brazil (Tables 1 and 2), the top 30 food processing companies in the United States are on average sixteen times bigger than Brazilian companies (see last row of Tables 10 and 11).

TABLE 11
REVENUES OF TOP 30 FOOD PROCESSING COMPANIES IN BRAZIL, 2001

Rank	Company	**Revenues** (US$ million)
1	Bunge Alimentos (1+)	2,592
2	Nestlé	2,515
3	Cargill	1,995
4	Sadia (2+)	1,606
5	Perdigão (+)	1,249
6	Coamo	695
7	Parmalat Brasil (+)	601
8	Seara (1+)	576
9	Fleishmann Royal Nabisco (3)	517
10	Kraft Lacta (3)	481
11	Danone	456
12	Frangosul	405
13	Itambé *	373
14	Cosan	369
15	Caramuru Óleos Vegetais	369
16	Avipal (+)	367
17	Aurora *	349
18	Citrosuco Paulista	345
19	Moinhos Cruzeiro do Sul	318
20	Chapecó (+)	308
21	Elegê (4)	304
22	Elma Chips	288
23	Warner Lambert	275
24	Garoto (5)	270
25	Bianchini	267
26	Granja Rezende (2)	262
27	Braswey	262
28	Fábrica Fortaleza	256
29	Quaker	255
30	J.Macedo	239
31	Friboi	219
	Average Revenue	*625*

Notas: (+) Listed company in the São Paulo Stock Exchange (Bovespa).
* Farmer-owned cooperatives.
(1) Controlled by Bunge Ltd.
(2) Controlled by the Sadia group.
(3) Controlled by Kraft Foods.
(4) Controlled by the Avipal group.
(5) Acquired by Nestlé in 2002. Transaction under review by the Brazilian Anti-Trust Agency.
Source: Exame Melhores e Maiores, 2002 and Bovespa (*http://www.bovespa.com.br*).

Another remarkable difference is the dominance of multinational corporations in the leading positions of the Brazilian annual food revenue rank (Table 11). Among the top 10 food processing companies in Brazil, eight are multinational firms -three from the United States, two from Argentina, and one each from France, Italy and Switzerland-. In the United States, on the other hand, there are only two multinational firms among the top 30 food companies. As is explored further in the FDI section of this study, multinational companies' market share of the Brazilian food industry increased in the 1990s as a result of cross-border mergers and acquisitions.

It is also noteworthy that five agricultural cooperatives are ranked among the largest food companies in the United States, while only two cooperatives feature among Brazil's top 30 food companies. In the United States, agricultural cooperatives are privately held corporations that are farmer-owned and controlled. Their goal is to generate economic benefits to agricultural producers. Agricultural cooperatives play an important economic role in the US food system, as evidenced by their substantial asset ownership, revenues, and market share. According to US Department of Agriculture statistics (USDA [2002]), the nation's 3,229 agricultural cooperatives had combined memberships of over 3 million farmers, generated US$103 billion in aggregate sales, and accumulated US$48.5 billion in total assets in 2001. As a result of consolidation and exit, the number of US agricultural cooperatives has declined steadily since reaching its peak in the early 1930s.

Despite declining numbers, cooperatives are major players in providing production inputs and services to farmers, and in processing and marketing their commodities. In 1999, cooperative market shares for both farm commodity marketing and purchased inputs reached 27% in the United States (USDA [2002]). However, Rogers [2001] observes that cooperatives have an important presence in low-margin, first-handler markets but only a 5.4% average market share in all food and tobacco processing industries. In addition, cooperatives' market share in high value added industries is negatively correlated with the ratio of industry value added to value of shipments.

Although less relevant than in the United States -in both absolute and relative terms- cooperatives are still an important part of the Brazilian food and agribusiness system. According to the Brazilian Cooperatives Association (OCB [2003]), there are 1,662 agriculture cooperatives in Brazil, several of them devoted to food processing. Their share in several food manufacturing industries, however, has been declining in recent years, as some large cooperatives have been taken over by multinational corporations. Cooperative financial indicators, such as leverage and profitability, suggest that this organizational form faces difficulties in competing with national or multinational corporations in processed food markets. There are, nonetheless, remarkable examples of cooperative business successes in Brazil, such as the dairy cooperative Itambé and the grain marketing cooperative Coamo.

III. MARKET CONCENTRATION, PRODUCT DIVERSIFICATION, AND VERTICAL COORDINATION IN SELECTED FOOD INDUSTRIES

This section discusses market concentration, product diversification and vertical coordination for a selected group of food manufacturing industries, including grains, meat, dairy goods, coffee, orange juice, and sugar. It uses quantitative and qualitative data to compare the number of firms, concentration ratios, product diversification and downstream and upstream linkages in these sub-sectors in the United States and Brazil. The aim is to identify possible entry barriers in each industry and strategic movements that might be induced by the FTAA.

The US data are in Tables 12 and 13. Table 12 presents Census of Manufacturers data on the number of firms, value of shipments and concentration ratios for selected food industries in 1997. The data confirm Rogers's [2001] finding of increased market concentration in US food manufacturing industries. Table 13 shows the use of marketing contracts, production contracts and vertical integration for selected agricultural commodities in 1996 based on US Department of Agriculture Economic Research Service (ERS) data. It is noteworthy that 45% of total farm output was marketed by means of non-market arrangements in that year, up from 38% in 1990 (Martinez and Reed [1996]).

TABLE 12
NUMBER OF FIRMS, VALUE OF SHIPMENTS AND CONCENTRATION RATIOS FOR SELECTED FOOD INDUSTRIES, 1997

NAICS Code	Code Description	Number of Companies	Value of Shipments (US$ billion)	4 Largest	8 Largest	20 Largest
3112	**Grain and oilseed milling**	**534**	**52.08**	--	--	--
311211	Flour milling	254	8.00	48.4	62.5	79.2
311212	Rice milling	56	2.36	51.8	75.3	92.5
311213	Malt manufacturing	19	0.78	69.0	94.5	100.0
311221	Wet corn milling	30	8.46	71.7	90.3	99.8
311222	Soybean processing	43	14.04	79.6	94.5	99.5
311223	Other oilseed processing	32	1.72	66.6	81.9	98.9
311225	Fats and oils refining and blending	91	7.62	36.7	63.0	89.5
311230	Breakfast cereal manufacturing	48	9.10	82.9	93.5	99.2
3113	**Sugar and confectionery products**	**1,556**	**24.11**	--	--	--
311311	Sugar cane mills	34	1.46	56.6	71.4	94.3
311312	Cane sugar refining	12	3.21	98.7	99.9	100.0
311313	Beet sugar manufacturing	8	2.73	85.0	100.0	100.0
3114	**Fruits and vegetable preserving**	**1,394**	**46.62**	--	--	--
311411	Frozen fruit, juice, and vegetable manufacturing	177	9.55	34.3	47.4	70.6
3115	**Dairy products**	**1,329**	**58.67**	--	--	--
311511	Fluid milk manufacturing	402	22.00	21.3	31.0	50.5
311512	Creamery butter manufacturing	32	1.37	52.4	73.2	97.3
311513	Cheese manufacturing	399	20.23	34.6	50.9	70.6
311514	Dry, condensed, and evaporated dairy product manufacturing	169	9.22	47.1	58.6	78.1
311520	Ice cream and frozen dessert manufacturing	409	5.86	32.3	48.7	71.1
3116	**Meat product manufacturing**	**2,794**	**112.98**	--	--	--
311611	Animal slaughtering (except poultry)	1,307	54.28	57.0	70.8	81.5
311612	Meat processed from carcasses	1,163	24.26	20.4	30.3	45.0
311613	Rendering and meat byproduct processing	137	2.56	37.4	54.1	75.5
311615	Poultry processing	257	31.88	40.6	54.0	72.6
3119	**Other food manufacturing**	**2,493**	**48.91**	--	--	--
311920	Coffee and tea manufacturing	215	7.97	52.5	65.6	84.4

Source: 1997 Census of Manufacturers.

TABLE 13
NON-MARKET VERTICAL COORDINATION MECHANISMS IN US AGRICULTURE, 1996
(Percentages)

Product	Production Contracts (1)	Marketing Contracts (2)	Ownership Integration (3)	Total
Crops:				
Feed grains	<1	18	1	19
Hay	<1	0	0	<1
Food grains	<1	14	1	15
Vegetables for fresh market	22	0	40	62
Vegetables for processing	97	0	2	99
Dry beans and peas	<1	26	1	27
Potatoes	44	0	44	88
Citrus fruits	0	88	7	95
Other fruits and nuts	0	43	25	68
Sugar beets	99	0	1	100
Sugar cane	48	0	52	100
Cotton	<1	35	1	36
Tobacco	9	<1	2	11
Soybeans	0	17	<1	17
Livestock:				
Fed cattle	0	18	3	21
Sheep and lambs	0	7	14	21
Market hogs	30	<1	11	41
Fluid-grade milk	<1	94	0	94
Manufacturing-grade milk	0	89	<1	89
Market eggs	37	2	58	97
Hatching eggs	74	0	26	100
Broilers	85	0	14	99
Turkeys	56	5	32	93
Total Farm Output (4)	*10*	*27*	*8*	*45*

Notes: (1) Resource providing contracts entered into before production begins.

(2) A contract to market output that is already committed, including most contracts with marketing cooperatives and forward contracts specifying where the product is to be marketed and the pricing method.

(3) The same firm owns farms and other vertically related operations such as a hatchery, feed mill, processing plant, or packer-shipper.

(4) The percent of total farm output under contracts and ownership integration includes only the products listed in the tables.

Source: Harris, *et al*. [2002].

The Brazilian data are obtained from a variety of studies of selected industries drawn up by the Brazilian Competition System (SEAE and CADE), governmental research institutes (such as IPEA and IPARDES) and university research programs. As in the United States, market concentration has been increasing since the beginning of the 1990s, but in general without negative effects on competition. As firms get bigger as a result of growth and consolidation, they benefit from several sources of scale and scope economies. Despite industry consolidation, Brazilian firms are still much smaller than food manufacturing companies in the United States, which might be a competitive advantage for US firms in the event of the FTAA.

Grains

Grain processing and marketing companies tend to be very large and diversified conglomerates that operate in multiple markets and several countries. Since they usually deal with agricultural commodities traded worldwide, they require capabilities to operate on a global scale. These capabilities include grain origination, processing and logistics in the main grain producing countries. Perhaps unsurprisingly, the same grain processors that operate in the United States -such as Cargill, Bunge, and ADM- are the leading grain companies in Brazil. Despite these similarities, grain companies in the US tend to be larger in absolute and relative terms. In contrast, the Brazilian grain industry features several small firms that operate in informal or regional markets.

There are 534 firms in the United States with operations in grain and oilseed milling; these have an aggregate value of shipments totaling US$52 billion. The number of firms and concentration ratios vary according to specific, narrowly defined six-digit NAICS industries (Table 12). With the exception of fats and oils refining and blending, all grain industries exhibit concentration ratios (CR4) higher than 40% -a characteristic of oligopolies-. For example, the four largest manufacturers control almost 83% of the breakfast cereal market. Industries that procure grain inputs directly from farmers also exhibit high concentration ratios, including soybean processing, wet corn milling and other oilseed processing. The presence and extent of oligopsony power in the grain industry is difficult to assess because of the lack of data (Rogers [2001]).

Heterogeneity is the most distinguishing feature in the Brazilian grain and oilseed milling industries. According to the Ministry of Labor, there are more than 7,000 establishments in the Brazilian grain industry, employing 166,000 workers. Several of these firms are quite small and operate in regional markets. Small firms are able to survive in increasingly competitive markets because of sunk costs -as in the case of traditional wheat milling- and tax evasion. Loayza ([1996] p. 149) estimates informality in the Brazilian market at about 38% of GDP, which is the average for Latin American countries. The presence of informality is predominant in industries with low entry barriers, especially those related to technological capabilities, such as dry corn milling, and rice and beans packaging. There are also low entry barriers in segments of the dairy goods, beef and coffee roasting industries.

By contrast, large multinational companies are the dominant players, and there are few small regional companies, in industries featuring high entry barriers such as wet corn milling, soybean processing, breakfast cereal manufacturing and bakery products. In breakfast cereal manufacturing, for example, Kellogg supplies 61% of the Brazilian market, followed by Nestlé with 11%. In the wheat milling industry, Bunge is the market leader with 15% of total industry capacity (Table 14). In bakery products, three companies account for 75% of the Brazilian market, while 250 small firms operate in the competitive fringe (Souza, *et al*. [1998]). Additionally, four leading companies -all multinationals- account for 35% of the total soybean-crushing capacity and 48% of oilseed refining (Table 15). In short, the "big-small" model presented in the previous section predominates in industries with higher entry barriers. In these industries, large multinational firms have dominant market positions in Brazil but coexist with a competitive fringe comprised of small companies.

Farmer-owned cooperatives are important players in grain industries in both the United States and Brazil. Agricultural cooperatives originate and market roughly 40% of all grains and soybeans in the United States, as in Brazil. A recent trend is for US cooperatives to form strategic alliances

with food companies, such as Horizon Milling LLC (a joint venture between CHS Cooperatives and Cargill in wheat milling) and ADM/Farmland Inc. (a grain marketing joint venture between Farmland and ADM). This type of arrangement, not common in Brazil, allows capital-constrained cooperatives access to downstream profits in the supply chain (Chaddad and Cook [2003]). In addition, strategic alliances enable grain firms to combine complementary resources -cooperatives' grain originating and handling assets with large companies' global trade and logistics capacities-.

TABLE 14
WHEAT INDUSTRY IN BRAZIL: MARKET SHARES IN 1996

Company	**Number of Establishments**	**Share in Total Milling Capacity** (%)
Bunge	11	15.39
J. Macedo	9	8.85
Pena Branca	6	5.53
Anaconda	2	4.02
Ocrim	3	2.70
Vera Cruz	2	2.41
Indígena	3	2.21
Buaiz	2	2.01
Garota	2	1.61
Dallas	2	1.31
Tondo	3	1.21
Other Companies	166	52.76
CR4	**28**	**33.79**
Total	*202*	*100.00*

Source: Brazilian Wheat Industry Association (ABITRIGO) in Garcia [1997].

TABLE 15
SOYBEAN INDUSTRY IN BRAZIL: MARKET SHARES IN 2000

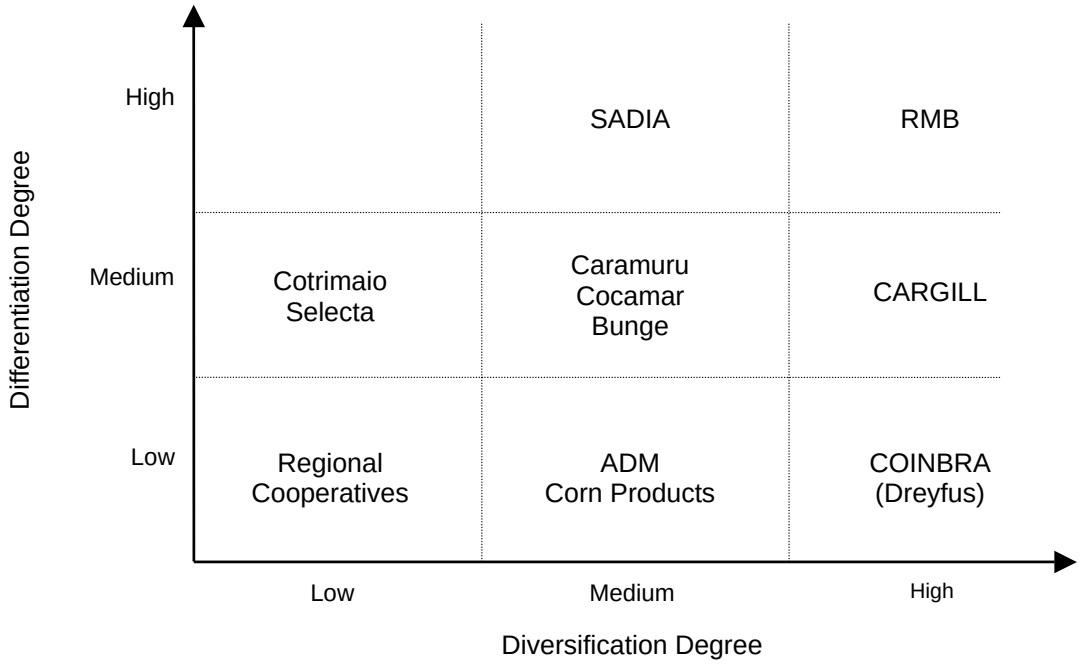
Company	**Soybean Processing**		**Fats and Oils Refining**	
	Capacity (tons/day)	*Share in Total Capacity* (%)	*Capacity* (tons/day)	*Share in Total Capacity* (%)
Bunge	15,980	13.7	1,000	26.5
Cargill	11,000	9.4	1,220	8.5
Coinbra (Dreyfus)	7,950	6.8	1,220	8.5
ADM	6,570	5.6	600	4.2
Other companies	88,370	64.6	10,272	52.0
CR4	**41,500**	**35.4**	**4,040**	**48.0**
Total	*129,870*	*100.0*	*14,312*	*100.0*

Source: Brazilian Oilseed Processing Industry Association (ABIOVE).

In addition to their large size, multinational grain companies are also diversified across product markets in order to explore economies of scale and scope. Examples include Cargill, Bunge and

ADM, which operate in all grain processing industries identified in Table 12, with the exception of cereal breakfast manufacturing. These grain companies usually specialize in non-differentiated commodities, allowing them to explore their competitive advantages in global trading and logistics. Firms that operate mainly with final consumer products -such as RMB and Sadia in Brazil- rely more on differentiation as a competitive strategy, with marketing and branding as major competences (Figure 6). Finally, smaller firms in Brazil, such as Selecta and the grain cooperative Cotrimaio, are exploring their ability to segregate grains in order to preserve the identity of differentiated products, such as organic and non-GMO soybeans. Because these companies operate on a smaller scale, they can devote storage and crushing facilities to segregate grains with specific quality attributes, and thereby exploit fast-growing niche markets of identity-preserved products (Leonelli and Azevedo [2001]).

FIGURE 6
STRATEGIC POSITIONING OF SELECTED GRAIN COMPANIES IN BRAZIL



Source: Lazzarini and Nunes [1998].

Relative to other sub-sectors, grain supply chains tend to be less vertically coordinated, since most grains are marketed by means of spot market transactions in both the United States and Brazil. Grain producers, however, are increasingly using marketing contracts. For example, 18% of feed grains, 14% of food grains and 17% of soybeans are marketed either through forward contracts or cooperatives in the United States (Table 13). Although they are relatively unimportant in grain marketing, production contracts are increasingly used in identity-preserved supply chains such as high oil corn and high sucrose soybeans (Kalaitzandonakes and Maltsbarger [1998]). Similar trends are apparent in Brazil, particularly in the case of organic and non-GMO products. Given the operational difficulties of grain segregation in traditional storage systems in Brazil, firms that operate with such products -differentiated but hard to evaluate by simple inspection- tend to rely

on contracts with producers (the case of Selecta) or even quasi-vertical integration, which is the case of Insolo (Leonelli and Azevedo [2001]; Marino, et al. [2002]).

Meat

With different industry structures and companies adopting different competitive strategies, the meat industry in Brazil and the United States will probably be particularly affected by the FTAA, in terms of both competition and market opportunities. In particular, Brazilian meat companies might be targets of US firms that are expanding internationally, including Tyson Foods and Smithfield. As grain production expands into the Brazilian Middle-West region and the consumption of domestic meat products increases, US companies might be poised to take over the dominant meat businesses in Brazil, such as Sadia and Perdigão.

Table 12 shows that there are 2,794 firms operating in meat product manufacturing industries in the United States. The industry's total value of shipments reached almost US$113 billion in 1997. Animal slaughtering is the largest meat industry, with 1,307 firms and US$54 billion in total value of shipments. Despite the large number of firms, this industry is highly concentrated with CR4 of 57%. More disaggregated data collected by GIPSA, the USDA agency responsible for inspecting animal slaughtering plants, reveal even higher concentration ratios for specific meatpacking industries: 69% for cattle, 67% for sheep and lamb, and 56% for hogs. It is interesting to note, however, that market concentration is less pronounced in meat processed from carcasses than in animal slaughtering. Despite the smaller number of firms operating in poultry processing, concentration is lower than in meatpacking. The market share of the four largest poultry processors in the United States is 40%.

The Brazilian meat industry is less concentrated than in the United States in all its main branches: poultry, pork and beef. According to the Brazilian Ministry of Labor, there were 2,674 establishments devoted to animal slaughtering and meat processing in 2001; these employed 193,000 workers. The domestic meat market is quite competitive and dominated by Brazilian firms, most of which belong to diversified family groups. In both poultry and pork industries, the four leading firms account for about 30% of the market, followed by several medium and small firms (Tables 16 and 17). In the beef industry, meat packers compete with informal slaughtering establishments, which account for about 40% of the Brazilian beef market (Azevedo and Bankuti [2002]). The largest pork and poultry firms in Brazil have left the beef slaughtering business because of unfair competition arising from informality and tax evasion. Companies such as Sadia still export processed beef but outsource animal slaughtering activities to their suppliers.

The Brazilian poultry, pork and beef industries share a common feature: concentration ratios are significantly higher in export markets, with CR4s consistently above 60% (Tables 16, 17 and 18). Although concentration ratios in exports are quite large, they do not imply any degree of market power, since firms compete in highly competitive international markets. However, the difference in concentration ratios reflects higher mobility barriers for firms moving from domestic to export markets. In addition to the high product quality standards required in export markets, the necessary fixed costs and specialized resources prevent most Brazilian meat companies from participating in international marketing.

TABLE 16
POULTRY INDUSTRY IN BRAZIL, 2000

Company	Production		Company	Exports	
	Capacity (million heads)	*Share in Total Capacity* (%)		*Volume* (million heads)	*Share in Total Exports* (%)
Sadia	382.2	11.8	Sadia	260.4	28.7
Perdigão	291.0	9.0	Perdigão	193.3	21.3
Frangosul	196.6	6.1	Seara	155.6	17.2
Seara	178.0	5.5	Frangosul	115.9	12.8
Avipal	136.6	4.2	Chapecó	52.8	5.8
Pena Branca	109.4	3.4	Minuano	21.2	2.3
Dagranja	94.2	2.9	Aurora	20.2	2.2
Chapecó	86.6	2.7	Avipal	10.6	1.2
Aurora	74.2	2.3	Copacol	9.8	1.1
Sertanejo	48.4	1.5	Vêneto	7.9	0.9
Other Companies	1,647.0	50.8	Other Companies	59.0	6.5
CR4	**1,047.8**	**32.3**	**CR4**	**725.2**	**80.0**
Total	*3,244.2*	*100.0*	*Total*	*906.7*	*100.0*

Source: Brazilian Poultry Processors and Exporters Association (ABEF).

TABLE 17
PORK INDUSTRY IN BRAZIL, 2000

Company	Production		Company	Exports	
	Capacity (million heads)	*Share in Total Capacity* (%)		*Volume* (million heads)	*Share in Total Exports* (%)
Sadia	2,897	11.6	Seara	35,151	27.5
Perdigão	1,720	6.9	Sadia	22,766	17.8
Aurora	1,640	6.6	Perdigão	14,144	11.1
Seara	1,331	5.3	Chapecó	10,155	7.9
Chapecó	861	3.5	Aurora	6,715	5.3
Riosulense	777	3.1	Avipal	6,658	5.2
Avipal	467	1.9	Frangosul	5,391	4.2
Frangosul	424	1.7	Cosuel	4,204	3.3
Rezende	375	1.5	Riosulense	3,400	2.7
Sudcoop	313	1.3	Batávia	2,545	2.0
Other Companies	14,106	56.6	Other Companies	59,0	6.5
CR4	**7,588**	**30.5**	**CR4**	**82,216**	**64.3**
Total	*24,911*	*100.0*	*Total*	*127,883*	*100.0*

Source: Brazilian Pork Processors and Exporters Association (ABIPECS).

TABLE 18
BRAZILIAN BEEF PROCESSORS EXPORTS, 1999

Company	Raw Beef Carcasses (% share)	Processed Beef Products (% share)
Frigorífico Bertin Ltda.	19.1	37.8
Swift Armour S.A.	11.4	20.6
Frigorífico Independência	18.9	--
Frigorífico Friboi	13.2	--
Anglo Alimentos S.A.	--	18.6
Sola S.A. Inds. Alimentícias	--	11.3
CR4	**62.6**	**88.3**

Source: Brazilian Beef Industry Association (ABIEC) in Vinholis [2001].

As with grain processors, meat product manufacturing companies tend to be diversified across markets. The largest meat processor in the United States, Tyson Foods, operates 128 plants in chicken, beef, pork processing and prepared foods. The second largest meat company, Excel Corp. (a division of Cargill), has high market shares in beef and pork both for fresh and case-ready markets. Smithfield Foods, the world's largest vertically integrated hog producer and processor, also operates beef slaughtering plants. ConAgra is the most diversified firm among US meat manufacturers, with operations in fresh beef, pork, lamb, turkey and chicken, in addition to further processed and ready-to-eat products.

Similar meat company diversification patterns are evident in Brazil, where firms explore scope economies by operating in chicken, pork, and several related industries, such as meat processing, animal feeds, grain trading and genetic breeding. Brazilian beef packers are less diversified than poultry and pork processors. They tend to specialize in beef slaughtering, and sometimes integrate backwards and forwards in the production chain -for example, into cattle raising, leather manufacturing and, less often, meat retailing-. This form of organization among beef packers, distinct from the US beef and the Brazilian poultry and pork industries, arises from the high level of informality in the Brazilian beef industry. As the degree of informality raises the costs of using formal contracts, vertical integration is more likely.

Meat sub-sectors differ as regards the vertical linkages between supply chain participants (Table 13). In the US beef sub-sector, transactions between cattle feeders and meatpackers are mostly in spot and auction markets, while 18% of feeder cattle are marketed through marketing contracts. Vertical integration and production contracts are not common in the US beef industry, but tightly coordinated beef supply chains are increasingly organized as strategic alliances (Lawrence, Schroeder and Hayenga [2002]). In sharp contrast to beef, the broiler, hog, and turkey sub-sectors rely more heavily on non-market vertical coordination mechanisms. For example, 85% of the broilers in the US are marketed through production contracts. Some authors estimate that almost all broiler production in Brazil is coordinated by production contracts between growers and processors, which include the supply of one-day chicks, feed, and technical assistance to growers (IPARDES [2002]). The pork industry's vertical coordination patterns change significantly in both countries in the 1990s, with a dramatic increase in the use of production contracts (Ferreira [1998]; Martinez [2002]). More recent data show that the share of hogs sold through contractual arrangements increased from 10% in 1993 to 72% in 2001 in the US (Martinez [2002]).

Dairy Products

The US and Brazilian dairy industries play important economic roles in terms of employment, number of firms, and total value of shipments. The dairy industry comprises several product groups -such as fluid milk, cheese, butter, condensed milk and yogurt, among others-. These dairy product markets demand distinct company capabilities and present different entry barriers to market competitors. Consequently, concentration ratios vary markedly across dairy product markets in the two countries.

Dairy product manufacturing is the second largest food industry group in the United States, with 1,329 firms and approximately US$60 billion in total value of shipments (Table 12). Industry structure varies across dairy markets: higher concentration ratios in butter manufacturing and dry, condensed and evaporated dairy products; and relatively lower market concentration in fluid milk,

cheese and ice cream manufacturing. Corporations dominate fluid milk and high value-added dairy product markets. Unlike other food industries in the United States, dairy companies concentrate on narrow product lines (Blayney and Manchester [2000]). In the dairy business, for instance, they may deal only in cheese (Kraft Foods, Saputo Group and Leprino Foods, for example), only in yogurt (Danone), or only in premium ice cream (Diageo and Nestlé).

Though much smaller than in the United States, the Brazilian dairy industry is the largest food sector in the country, with a total shipment value of US$7.3 billion. The Brazilian dairy industry comprises about 6,000 processing establishments and employed over 70,000 people in 2001. It is highly diverse and is generally divided into three strategic groups (De Negri [1996]): (i) differentiated dairy products, with capacity in perishable goods marketing and logistics; (ii) dairy commodities demanding large-scale operations to minimize processing costs; and (iii) regional firms operating in the informal market. Informality in the dairy industry is estimated to account for 28% of Brazil's total milk production (Farina, *et al*. [2000]).

As in the United States, concentration ratios vary across dairy product markets in Brazil. Some products -such as skim milk, condensed milk and dairy beverages- are typically explored by firms of the first strategic group. In these markets, the four leading firms control over 80% of the market (Table 19). Most firms in the first group -Nestlé, Parmalat, Danone and Fleischmann- are diversified, multinational processors. Dairy markets explored by the other groups -fluid milk, cheese and dairy-based desserts (such as the popular doce de leite)- have low concentration ratios since small, informal firms operate in regional markets. Despite the presence of European dairy processors, most firms in the Brazilian dairy industry are family owned and operated.

TABLE 19
DAIRY INDUSTRY IN BRAZIL: MARKET SHARES IN SELECTED PRODUCT MARKETS, 2002

Company	Skim Milk	Condensed Milk	Dairy Beverages
Nestlé	35.91	43.33	2.38
Fleischmann	21.98	22.07	0.90
Parmalat	19.43	16.45	36.59
Mococa	7.86	12.68	3.56
Elegê	4.95	--	3.22
Paulista	4.27	--	2.92
Itambé	2.15	5.47	5.93
Quacker	--	--	38.61
Leco	0.75	--	1.10
ValeDourado	0.65	--	3.78
Other Companies	2.05	--	1.01
CR4	85.18	94.53	84.91
Total	*100.00*	*100.00*	*100.00*

Source: SEAE, Ato de Concentração Nº 08012.006805/2001-29.

The Brazilian dairy industry underwent dramatic structural changes -including deregulation, consolidation and multinationalization- from the early 1980s to the 1990s. In 1981, the three leading dairy firms -Nestlé and two domestic companies- had a combined 52% of the market. In 1996, the top three firms -Nestlé, Parmalat and the cooperative Itambé- controlled 61% of the market. The two multinationals alone (Nestlé and Parmalat) had a combined market share of 53%. Parmalat entered the market in 1988 and by 1996 it had 13% of the market. Parmalat's rapid growth

stemmed from the acquisition of two dozen domestic firms between 1988 and 1997 (Jank, *et al*. [1999]). There was a slight de-concentration in the late 1990s -although this is unlikely to mark a significant reversal of the recent trend towards consolidation- as the CR12 fell from 53% to 48% of inspected milk processed (Table 20; Farina [2002] p. 452).

Until the 1990s, regional dairy cooperatives -known as *centrais* because they are organized as a federation of local cooperatives, the *singulares*- played an important economic role in the Brazilian dairy industry. The dairy industry was deregulated between 1989 and 1993 as the Brazilian government liberalized dairy marketing and freed retail and farm prices. Deregulation spurred industry rivalry as firms began competing vigorously in price and cost-cutting. Additionally, macroeconomic stabilization policies and the rise of supermarket power in food markets negatively affected dairy processing margins in the mid-1990s. The once-dominant "central" cooperatives could not keep up with the new competition and most of them struggled financially. As a result, Brazilian cooperatives became easy prey to acquisitive multinational companies. Today, only one cooperative (Itambé) ranks among the 12 largest dairy companies. Paulista -number 5 in 2000- recently sold its brand name and some processing plants to the French multinational Danone.

In the late 1990s, the Brazilian dairy industry was again affected by institutional change. Private standards were instituted by the leading dairy processors to reduce procurement costs, provide investment incentives and raise technical efficiency in dairy farms. They required milk cooling at the farm level to enable bulk transportation to processing plants, which reduces procurement costs and improves the quality of the raw material. As a result, the number of farms delivering milk to the 12 leading companies dropped by 35% -equivalent to 60,000 dairy farms- with a concomitant 55% increase in average milk production per farm during the period 1997-2000 (Table 20). This phenomenon is not confined to private companies and multinationals. Itambé, the largest Brazilian dairy cooperative, reduced the number of farmer-members (by voluntary and forced exit) by almost 50%, while the average farm scale grew by 130% (Farina [2002] p. 454).

TABLE 20
12 LARGEST BRAZILIAN DAIRY COMPANIES BY MILK PROCESSED

Companies	Annual milk reception (liters m.)				N° of milk suppliers				Production per day (farmer/day/farmer)			
	1997	1998	1999	2000	1997	1998	1999	2000	1997	1998	1999	2000
Nestlé (a)	1,413	1,358	1,336	1,393	35,089	28,920	22,512	14,142	110	129	163	270
Parmalat (a)	857	814	773	919	21,040	16,052	14,302	15,550	112	139	148	162
Itambé (co-op)	730	753	797	773	18,250	15,369	12,690	8,400	110	134	172	252
Elegê (Avipal)	607	603	660	760	38,537	34,402	34,402	32,188	43	48	53	65
Paulista (co-op)	673	626	419	513	24,481	22,162	15,154	8,925	75	77	76	157
Batavia (Parmalat) (b)	273	274	297	273	1,125	1,093	7,772	7,505	67	72	105	100
Vigor Group (MD Foods) (b)	295	288	231	230	8,142	6,442	4,823	3,693	99	122	131	170
Leite Líder	141	165	192	207	5,880	6,930	8,650	8,795	66	65	61	64
Centroleite	132	151	141	175	3,180	3,355	3,335	4,205	114	123	116	114
Latricínios Morrinhos	105	121	153	146	4,300	4,250	6,677	7,292	67	78	63	55
Fleischmann Royal (a)	166	184	185	140	4,000	3,000	2,640	2,335	114	168	192	164
Danone (a)	167	144	120	130	1,426	1,180	995	1,420	321	335	330	251
Total	5,560	5,480	5,303	5,659	175,450	152,455	133,952	114,450	87	98	108	135
CR_{12} - Formal market (%)	52.6	50.1	47.9	48.0								
CR_{12} - Total market (%)	29.8	29.3	27.8	29.3								

Notes: (a) multinational; (b) national/multinational partnership
Source: *http://www,terraviva.com.br*

Despite these structural changes, marketing contracts between producers and dairy processors are rare in Brazil, since milk production still is highly atomistic. In the United States, however, 94% of fluid grade milk and 89% of manufacturing grade milk are sold through marketing contracts between producers and processors (Table 13). Cooperatives are the main marketers of raw milk from dairy farms; 83% of US milk is collected and handled by agricultural cooperatives (Blayney and Manchester, 2000). In addition, dairy cooperatives process and market significant shares of butter, natural cheese and non-fat dry milk.

Coffee

The coffee industry comprises two distinct strategic groups -ground-roasted coffee and instant coffee- that operate with completely different structures and competitive patterns. Although Brazil is the world's largest coffee producer, international coffee markets are dominated by multinational coffee processors. Two US coffee processors -Sara Lee and Kraft Foods- hold dominant positions in the Brazilian domestic market.

Quantitative data on the number of firms and concentration ratios for coffee manufacturing in the United States are available for the 6-digit NAICS industry defined as coffee and tea manufacturing. In 1997, there were 215 firms in this industry, with a combined value of shipments of US$8 billion (Table 12). The four largest firms accounted for 53% of total industry shipments. The largest players in the coffee manufacturing industry are multinational, diversified corporations including Procter and Gamble, Kraft Foods, Nestlé, and Sara Lee. Since the United States does not produce coffee beans, coffee processors depend on imports as a procurement strategy. The main coffee exporters to the United States include Brazil, Colombia and Mexico.

The Brazilian ground-roasted coffee industry is quite competitive, with more than 1,000 establishments in 2001. According to the Brazilian Ministry of Labor, the coffee industry employs 16,000 workers. Coffee processors are not diversified, since they tend to focus on coffee processing and marketing. The coffee industry's structure has changed dramatically since the entry of Sara Lee in 1998. Following the acquisition of Café do Ponto in 1999, Sara Lee's market share increased to 19.2% in 2002, up from 6% in 1998 (Saes and Farina [1999]). In addition to industry consolidation, the growth of Sara Lee forced incumbent Brazilian firms to change their competitive strategies. Strategic efforts have focused on horizontal differentiation based on different coffee blends, sizes and packaging. Since these industry changes are already under way, it is unlikely that the FTAA will induce significant additional market developments.

In contrast to the ground coffee market, the instant coffee industry is quite concentrated; the four leading firms account for 75% of the market (Leme and Souza [2000]). Companies in the instant coffee segment employ a little over 4,000 workers, which is equivalent to 25% of total employment in the ground coffee segment. The average wage, however, is more than twice that paid to workers in the ground-roasted coffee industry.

Vertical coordination practices in the Brazilian coffee industry changed substantially in the 1990s, particularly in the specialty coffee segment. Traditionally, Brazilian coffee processors have not developed adequate trading mechanisms to procure and market high quality coffee. The coffee industry simply neglected product quality control management because government regulation

favored scale economies in commodity coffee marketing. Following the deregulation of the coffee market in 1990, coffee processors gradually began to explore different market segments that demand higher quality coffee beans. Coffee processors therefore started to implement vertical coordination mechanisms to assure the supply of coffee beans with the quality attributes required for their increasingly diversified product lines. Consequently, coffee processors are making increasing use of contracts with growers or, more commonly, signaling strategies such as regional branding.

Orange Juice

Combined, Brazil and the United States are responsible for half of the world's total supply of oranges and 85% of orange juice processing capacity. More strikingly, orange production and processing is concentrated in just two states: Florida and São Paulo. Both industries compete globally in intermediary product markets, particularly in frozen concentrated orange juice (FCOJ). The industries, however, are quite complementary: Brazilian firms focus on orange crushing and logistics while US companies dominate ready-to-drink and not-from-concentrate juice markets.

The Brazilian orange juice industry is highly concentrated, since the four leading processors control almost 73% of total crushing capacity (Table 21). The two leading firms are domestic companies that were originally packing houses. The third- and fourth-ranked companies are multinationals of US and French capital. It is also noteworthy that the industry has some features -homogeneous product, low price elasticity, and high concentration- that make tacit collusion likely.

TABLE 21
ORANGE JUICE INDUSTRY IN BRAZIL:
SHARES IN CRUSHING CAPACITY, 2001

Company	**Crushing Capacity Share** (%)
Citrosuco	24.9
Cutrale	23.6
Cargill	12.3
Coinbra (Dreyfus)	12.0
Citrovita	11.6
Others	15.6
CR4	72.8
Total	*100.0*

Source: FMC.

Although there are about 30 orange processing companies in Brazil, the four leading processors control the entire bulk transportation system. Since Brazilian exports are predominantly in FCOJ form and bulk transportation systems have cost savings of 15% of final FCOJ price, these four processors also hold dominant positions in export markets. Other orange processors have two alternatives: rent larger firms' bulk transportation systems, or explore the small but growing domestic orange juice market.

The Census of Manufacturers does not offer disaggregated data for the US orange juice industry. Instead, data are available for the industry defined as frozen fruit, juice and vegetable manufacturing (NAICS code 311411). There are 177 processors in this industry, with a combined value of shipments reaching almost US$10 billion. The four largest processors account for 34% of total industry shipment value (Table 12).

However, concentration is more pronounced in the narrowly defined orange juice market. According to Hodges, *et al.* [2001], there are currently 52 citrus processing plants in Florida. Citrus juice products shipped by Florida processors were valued at US$3.5 billion in the 1999-2000 season. The two largest orange juice brands -Minute Made (Coca Cola Co.) and Tropicana (PepsiCo)- have a combined market share of over 50% (Jacobs [1994]). Citrus World, a marketing cooperative formed by citrus packinghouses in Florida, owns the third largest orange juice brand -Florida's Natural-. The four leading companies in Brazil are key players in the Florida industry, following the acquisition of incumbent plants during the 1990s. As explored in the orange juice case study, Brazilian firms do not compete directly with the largest US orange juice brands, positioning as their suppliers of non-branded orange juice.

Table 13 shows that 95% of citrus fruits in the United States are transacted by means of non-market arrangements. In particular, 88% of citrus output is sold through marketing contracts between growers and processors, including contracts with farmer-owned packing houses. Additionally, 7% of citrus fruits are produced and processed by vertically integrated firms. The degree of vertical integration was higher in the late 1980s. In part, the reduction in vertically integrated orange production and processing is associated with the acquisition of Florida crushing plants by Brazilian firms (see the case study below). The coexistence of marketing contracts and vertical integration is also evident in the Brazilian orange industry, with two remarkable differences relative to the United States: (i) the proportion of backward vertical integration into orange growing is higher among Brazilian processors; and (ii) marketing contracts are based on pound solids in Florida (directly related to processing efficiency) but on boxes delivered in Brazil. These distinct characteristics are interrelated, and suggest that vertical coordination in the US orange industry is more efficient than in its Brazilian counterpart (Fernandes [2003]).

Sugar

With absolutely distinct market structures, the US and Brazilian sugar industries are likely to be affected by trade liberalization that includes the removal of tariff and non-tariff barriers. Brazil is the world's largest producer of sugar and is arguably the cost leader. If the FTAA includes liberalization of the US market, Brazilian sugar processors will benefit. This will probably occur through exports rather than FDI.

According to Table 12, there are 1,556 sugar and confectionery manufacturing firms in the United States, with a combined value of shipments of US$24 billion. Companies with sugar-related operations comprise the smaller portion of this broadly defined industry group, with US$7.4 billion in total shipment value. Sugar manufacturing industries are highly concentrated. The four largest sugar cane refiners have a combined market share of 99%, while the four largest sugar cane mills control almost 60% of the market. In addition, the CR4 in beet sugar manufacturing is 85%.

Unlike the industry structure in the United States, the Brazilian sugar industry is fragmented; the four leading companies control 23% of total sugar processing capacity (Table 22). Moreover, the leading brand -União- is actually a collective brand name owned by a cooperative of sugar companies. Such a structure is not conducive to horizontal coordination among sugar processors because of the impossibility of retaliation. In addition, as firms deal mainly with non-differentiated products, price competition is the rule and cost leadership strategies predominate.

TABLE 22
SUGAR INDUSTRY IN BRAZIL: MARKET SHARES IN 2000

Company	Capacity (tons/day)	Share in Total Capacity (%)
União	2.70	17.1
Da Barra	0.34	2.2
Açúcar Guarani	0.32	2.0
Caravelas	0.23	1.5
Doçula	0.21	1.3
Nova América	0.21	1.3
Others	11.78	74.6
CR4	3.59	22.8
Total	15.79	100.0

Source: SEAE, Ato de Concentração Nº 08012.005785/2001-79.

In Florida and Louisiana, where over 85% of US sugar cane is grown, the cane is delivered to a local mill. Subsequently, refineries process raw sugar into the refined white sugar used by consumers. Sugar cane milling and refining tend to be vertically integrated operations owned by proprietary companies such as Imperial Sugar Company and Tate & Lyle. In the northern plains, where beet sugar production is concentrated, no intermediate raw sugar is produced. Sugar beet production is carried out by eight processors. Beet growers cooperatively own three processors (American Crystal Sugar, Minn-Dak Farmers Cooperative and Southern Minnesota Beet Sugar Cooperative); combined, these account for 31% of sugar beet processing capacity (Moss and Schmitz [2000]).

Sugar sub-sectors exhibit a high degree of vertical coordination in the United States (Table 13). Some 99% of all sugar beets and 48% of total sugar cane production are marketed by means of production contracts. In addition, 52% of sugar cane production is vertically integrated between the growing and processing stages. Vertical integration is also the main procurement mechanism used by Brazilian sugar companies because of high site specificity. There is a trend, however, towards increased use of production contracts with independent sugar cane suppliers, especially in the state of São Paulo. Unlike in the United States, in general Brazilian sugar companies are diversified into ethanol production, which is used in Brazil as automobile fuel.

IV. AGRI-FOOD PRODUCT TRADE FLOWS AND TRADE BARRIERS

Brazil and the United States are key partners in international trade. The United States accounts for about a quarter of Brazil's total exports and a fifth of its imports. Brazil, in turn, takes 1.5% of total US exports and supplies 1.3% of total US imports. At first glance these figures differ, but they are strikingly similar when weighted by the economic size of each country, since US output is about 17 times greater than Brazil's.

This strong trade partnership, however, is not shared by the food system and by the food industry in particular. The economic significance of bilateral trade in food products is considerably less than for other products, with the exception of Brazil's relatively high share of US food imports. The main reason why neither country is an important destination for the other's agri-food exports is that their main products are competitors rather than complements. Since both countries' food systems are highly competitive, they participate in international markets as net exporters and, when one country is significantly more competitive than the other, tariff and non-tariff barriers are used to protect domestic production in the less competitive industry. In these cases, the FTAA might affect both countries' food systems if the trade agreement really eliminates or reduces trade barriers.

This section analyzes each country's trade in agricultural and food products, focusing on the main products and their relevance to the trade balance. It also discusses bilateral trade in agricultural and food products between the United States and Brazil, and identifies the share of industrialized food products relative to basic agricultural commodities. It subsequently measures each country's significance in the other's trade, so as to identify food product trade flows that might be significantly affected by the FTAA.

Primary sources of trade flow data include the US International Trade Commission (USITC) database for the United States, and the Foreign Trade Agency (SECEX) of the Ministry of Development, Industry and Commerce (MDIC) for Brazil. The data are aggregated here using the NAICS 6-digit classification system, which allows comparisons with the industry analysis data discussed in previous sections.

Trade in Agricultural and Food Products

The food system is important to the trade balance in the United States and Brazil. The increasing US trade deficit -US$470 billion in 2002- would be even higher without the US$10 billion surplus generated by the food system (Table 23). In the case of Brazil, the effect is not only positive but also quite significant. Without the food system, Brazil's US$12 billion trade surplus in 2002 -the largest in nine years- would become a trade deficit (Table 24). In other words, Brazil and the United States are net exporters of agricultural and food products. Consequently, both countries have an interest in developing foreign markets in order to explore the revealed competitiveness of their respective food systems.

Despite its positive effect on the trade balance, the US food system is relatively less oriented to international markets than its Brazilian counterpart. The food system's share of US GDP is 8.1% (Table 1), but its share of US foreign trade is lower, at 7.6% of total US exports and 3.8% of total

imports. In contrast, the Brazilian food system, which accounts for 26% of GDP (Table 2), is responsible for 27.3% of total exports and 7% of total imports. In both countries the food system's share of total exports is substantially greater than its share of total imports, which confirms the positive impact of food system exports on both countries' trade balances.

TABLE 23
US AGRI-FOOD SYSTEM TRADE FLOWS, 2001 AND 2002

Groups of Products	Exports (US$ billion)		Imports (US$ billion)		Trade Balance (US$ billion)		Share in Food Trade: Average 2001-2002 (%)	
	2001	2002	2001	2002	2001	2002	Exports	Imports
Grain	22.920	23.625	4.896	5.316	18.024	18.310	43.00	11.60
Agriculture	15.013	15.789	1.038	1.041	13.976	14.749	28.50	2.40
Soybean	5.451	5.624	0.031	0.028	5.420	5.596	10.20	0.10
Corn	4.765	5.128	0.135	0.137	4.630	4.990	9.10	0.30
Wheat	3.382	3.632	0.282	0.266	3.100	3.366	6.50	0.60
Others	1.415	1.406	0.590	0.610	0.825	0.797	2.60	1.40
Food Industry	7.908	7.836	3.859	4.275	4.049	3.561	14.50	9.30
First processing	7.256	7.172	2.435	2.704	4.821	4.468	13.30	5.90
Second processing	0.651	0.664	1.424	1.571	-0.773	-0.907	1.20	3.40
Meat	13.454	12.488	13.646	13.888	-0.192	-1.400	24.00	31.40
Beef and Pork	7.244	6.775	4.499	4.512	2.745	2.263	12.90	10.30
Poultry	2.407	1.834	0.094	0.113	2.313	1.721	3.90	0.20
Fish and Seafood	3.351	3.278	8.906	9.123	-5.555	-5.845	6.10	20.60
Others	0.453	0.601	0.148	0.141	0.305	0.461	1.00	0.30
Dairy	1.222	1.081	1.508	1.491	-0.286	-0.409	2.10	3.40
Coffee and Tea	0.391	0.398	0.777	0.786	-0.386	-0.388	0.70	1.80
Sugar Industry	1.407	1.200	2.728	3.047	-1.322	-1.847	2.40	6.60
Alcohol	0.127	0.072	0.178	0.170	-0.051	-0.098	0.20	0.40
Sugar	0.214	0.198	0.643	0.672	-0.429	-0.474	0.40	1.50
Chocolate	0.714	0.624	1.103	1.253	-0.389	-0.629	1.20	2.70
Non-chocolate confectionery	0.352	0.307	0.805	0.953	-0.452	-0.646	0.60	2.00
Fruits and Vegetables	6.961	7.098	10.103	10.807	-3.142	-3.708	13.00	23.80
Agriculture	4.223	4.344	6.918	7.284	-2.696	-2.940	7.90	16.20
Vegetables	1.675	1.772	2.728	2.798	-1.053	-1.026	3.20	6.30
Fresh fruit	2.548	2.572	4.190	4.486	-1.642	-1.914	4.70	9.90
Food Industry	2.738	2.754	3.185	3.522	-0.447	-0.768	5.10	7.60
Nuts	1.244	1.442	1.020	1.131	0.224	0.311	2.50	2.50
Agriculture	1.047	1.224	0.947	1.056	0.100	0.168	2.10	2.30
Food Industry	0.197	0.218	0.073	0.075	0.124	0.143	0.40	0.20
Others	6.714	6.620	8.135	8.431	-1.421	-1.810	12.30	18.90
Agriculture	3.850	3.733	6.262	6.343	-2.412	-2.610	7.00	14.40
Food Industry	2.864	2.888	1.873	2.087	0.991	0.800	5.30	4.50
Agri-food system	54.314	53.953	42.814	44.896	11.500	9.057	100	100
Agriculture	24.524	25.488	15.941	16.510	8.583	8.978	46.20	37.00
Food Industry	29.790	28.465	26.873	28.386	2.917	0.079	53.80	63.00
Total Trade Flow	*731.026*	*693.257*	*1,141.959*	*1,163.549*	*-410.933*	*-470.291*	*7.60**	*3.80**

Note: * Share of the agri-food system in total exports and imports.

Source: US International Trade Commission (USITC).

TABLE 24
BRAZILIAN AGRI-FOOD SYSTEM TRADE FLOWS, 2001 AND 2002

Groups of Products	Exports (US$ billion)		Imports (US$ billion)		Trade Balance (US$ billion)		Share in Food Trade: Average 2001-2002 (%)	
	2001	2002	2001	2002	2001	2002	Exports	Imports
Grain	6.071	6.482	1.762	1.745	4.309	4.738	38.90	48.80
Agriculture	5.379	5.531	1.353	1.332	4.025	4.199	33.80	37.30
Soybean	4.791	5.231	0.174	0.233	4.617	4.998	31.10	5.70
Corn	0.503	0.269	0.062	0.035	0.441	0.234	2.40	1.30
Wheat	0.000	0.000	0.872	0.879	-0.872	-0.879	0.00	24.40
Others	0.085	0.031	0.246	0.186	-0.160	-0.154	0.40	6.00
Food Industry	0.692	0.951	0.409	0.413	0.284	0.538	5.10	11.40
First processing	0.472	0.724	0.063	0.086	0.409	0.638	3.70	2.10
Second processing	0.220	0.227	0.345	0.327	-0.125	-0.100	1.40	9.30
Meat	3.414	3.782	0.497	0.474	2.917	3.308	22.30	13.50
Beef	1.063	1.160	0.065	0.076	0.998	1.084	6.90	2.00
Pork	0.376	0.487	0.028	0.025	0.348	0.462	2.70	0.70
Poultry	1.454	1.508	0.005	0.010	1.450	1.497	9.20	0.20
Fish	0.091	0.091	0.263	0.220	-0.172	-0.129	0.60	6.70
Seafood	0.192	0.252	0.004	0.002	0.188	0.249	1.40	0.10
Others	0.238	0.285	0.133	0.140	0.105	0.144	1.60	3.80
Dairy	0.026	0.041	0.185	0.253	-0.159	-0.211	0.20	6.10
Coffee and Tea	1.452	1.412	0.008	0.006	1.444	1.405	8.90	0.20
Coffee	1.417	1.385	0.002	0.002	1.415	1.383	8.70	0.10
Coffee beans	1.213	1.201	0.002	0.002	1.211	1.200	7.50	0.00
Instant Coffee	0.205	0.183	0.000	0.001	0.204	0.183	1.20	0.00
Tea	0.035	0.027	0.006	0.004	0.029	0.023	0.20	0.10
Sugar Industry	2.674	2.593	0.185	0.189	2.489	2.405	16.30	5.20
Alcohol	0.106	0.183	0.101	0.051	0.006	0.131	0.90	2.10
Sugar	2.279	2.104	0.000	0.000	2.279	2.104	13.60	0.00
Chocolate	0.174	0.207	0.061	0.123	0.113	0.083	1.20	2.60
Non-chocolate confectionery	0.115	0.100	0.023	0.014	0.092	0.087	0.70	0.50
Vegetables and Fruits	1.402	1.640	0.563	0.463	0.839	1.177	9.40	14.30
Agriculture	0.424	0.440	0.306	0.254	0.118	0.186	2.70	7.80
Vegetables	0.084	0.077	0.169	0.152	-0.085	-0.075	0.50	4.50
Fresh fruit	0.340	0.362	0.137	0.102	0.203	0.261	2.20	3.30
Food Industry	0.978	1.200	0.257	0.209	0.721	0.991	6.80	6.50
Processed vegetables	0.042	0.036	0.104	0.089	-0.061	-0.053	0.20	2.70
Orange juice	0.868	1.080	0.001	0.002	0.868	1.078	6.00	0.00
Others	0.067	0.084	0.152	0.118	-0.085	-0.033	0.50	3.80
Nuts	0.125	0.122	0.029	0.021	0.096	0.101	0.80	0.70
Others	0.558	0.439	0.378	0.434	0.180	0.005	3.10	11.30
Agriculture	0.026	0.031	0.068	0.131	-0.042	-0.101	0.20	2.80
Food Industry	0.532	0.408	0.309	0.302	0.223	0.106	2.90	8.50
Agri-food system	15.722	16.511	3.606	3.584	12.116	12.927	100.00	100.00
Agriculture	7.201	7.352	1.764	1.744	5.438	5.608	45.10	48.80
Food Industry	8.521	9.159	1.842	1.840	6.678	7.319	54.90	51.20
Total Trade Flow	58.223	59.640	55.572	47.232	2.650	12.408	27.30*	7.00*
Basic Products	15.342	16.952	6.777	6.891	8.565	10.061	27.40	13.30
Semi-manufactured	9.429	9.288	1.895	1.700	7.534	7.588	15.90	3.50
Manufactured	33.451	33.400	46.900	38.641	-13.449	-5.240	56.70	83.20

Note: * Share of the agri-food system in total exports and imports.

Source: Secretaria de Comércio Exterior (SECEX/MDIC).

A characteristic shared by both countries is that manufactured food products account for more than half of total food system trade flows. It is noteworthy that Brazil -a country that typically enjoys comparative advantages induced by natural resources and cheap labor- exports processed food products in comparable proportion to the United States (Tables 23 and 24). This does not mean that the two countries are not exploring their respective competitive advantages. As shown below, the Brazilian food system's trade surplus depends heavily on industries that Connor and Schiek [1997] have identified as supply-oriented, such as the grain, sugar, orange juice and meat processing. These industries' competitive advantage is partially attributable to the low costs of raw agricultural inputs made possible by a competitive agricultural sector. It is also worth noting that industrial products account for 86% of total Brazilian imports, but only 51% of total food imports. This indicates that the Brazilian food industry imports and processes raw agricultural commodities more intensely that other manufacturing industries, which import relatively higher shares of industrialized components or final products.

On the other hand, the higher proportion of industrialized food products among US food system imports may be explained by two factors: (i) the US food industry explores more intensely high value added activities, such as marketing and product development, given that a large part of processed food imports are non-branded products; and (ii) US export enhancement programs are conducive to agricultural commodity exports rather than processed food products (Jank, *et al*. [2001]).

For both Brazil and the United States, grain commodities are the main export food product group, accounting for about 40% of total food system exports. The main difference is that the share of industrialized grain product exports, relative to total grain exports, is much greater in the United States than in Brazil (Tables 23 and 24). US grain exports in "first-processed" form represents 13% of total food system exports, compared to only 4% in Brazil. Another remarkable difference is the high concentration of Brazilian exports in just one product, soybean (both grain and soybean meal). The soybean complex alone is responsible for a third of total Brazilian food system exports. US grain exports are more diversified, with three main agricultural commodities -soybean, corn and wheat- and several processed grain products.

Although grain products have a positive effect on both countries' trade balances, the economic importance of food imports is quite distinct. While grain products are the major source of trade surplus for the United States, with a relatively lesser share of imports, this product group is responsible for half of Brazilian food system imports. Brazil is a net importer of wheat and industrialized grain products.

The second food product group of significance to both countries' trade balance is meat products, which account for more than 20% of US and Brazilian food system exports. In addition, meat products account for a substantial share of total US food imports, equivalent to 31% of total food imports. More specifically, the United States is a large importer of fish and other seafood products. In addition to fish and seafood, the United States is also a net importer of fruits and vegetables, which contribute to a US$3 billion trade deficit. Processed fruit and vegetable imports, however, account for only 7.5% of the US fruit and vegetable processing industry's total value of shipments.

In addition to grain and meat products, the sugar (US$2.3 billion), coffee (US$1.4 billion) and orange juice (US$1 billion) industries are also very important to Brazil's exports and trade surplus.

This is not the case in the United States, despite the fact that these industries account for significant shares of the food industry's total employment and value of shipments. US sugar and sweetener imports represent only an eighth of the total value of shipments generated by the domestic sugar industry (Tables 6 and 23).

In short, the two countries' main tradable agri-food products are largely competitors. Grain, meat, sugar and orange juice are economically important industries in both countries, either in terms of domestic production or exports. This helps explain why US-Brazilian trade in food products is relatively modest. A corollary is that the FTAA negotiations to remove trade barriers will probably be conflictive, especially in the case of sugar and orange juice.

Bilateral Trade Between the United States and Brazil

Brazil had a relatively large trade surplus with the United States in 2002, in excess of US$5 billion when all products are taken into account (Table 25). The surplus was partially induced by the over-devaluation of the real in 2002 as a result of perceived political uncertainties preceding the presidential elections. As the real plunged against the dollar, Brazil's total imports fell by US$2.6 billion between 2001 and 2002, while total exports increased by US$1.2 billion. Economists predict future trade surpluses in Brazil as the new government adopts a floating, but less volatile, exchange rate.

The food system -not including other industries related to agriculture, such as shoes, textiles and paper and pulp- plays a secondary role in US-Brazilian trade. The food system accounts for 7.6% of total US exports but just 2.1% of US sales to Brazil (Tables 23 and 25). This secondary role of food system trade is reciprocal, inasmuch as the food system is responsible for only 7.2% of Brazilian exports to the United States, compared to 27% of Brazil's total exports. In brief, both countries are key partners in international trade, but not in agri-food products.

Food product bilateral trade between Brazil and the US is based mainly on processed products, particularly in the case of Brazilian exports to the United States. The food industry share (67.5%) is more than twice the size of the agriculture share (32.5%) of Brazilian agri-food system exports to the United States. This is partially explained by the presence of non-tariff barriers, such as sanitary and phytosanitary (SPS) restrictions, which inhibit fresh product exports to the United States. However, Brazil exports a high proportion of fresh meat products and fruits, which are more sensitive to non-tariff trade barriers. The low proportion of Brazilian agricultural commodity exports to the United States is mainly the result of negligible grain product exports, as the United States is an important competitor in international grain markets.

More than one third of US food exports to Brazil in 2002 consisted of wheat imported by Brazilian mills. This was not, however, a representative year, because the economic crisis in Argentina -traditionally Brazil's major wheat supplier- overwhelmed exporters' credit capacity for international trade. As a result of the Argentine crisis, Brazilian wheat imports from the United States boomed from US$10 million in 2001 to US$96 million in 2002, despite currency devaluation. It is therefore likely that Brazil will reduce wheat imports from the United States as Argentine wheat traders resume exports to Brazilian mills.

In addition to wheat, US exports to Brazil are quite diversified, including first-processed grains and several products classified as "others", such as flavoring extracts and syrups. With an equally diversified list of agri-food export products, Brazil's main exports to the United States are meat products -particularly processed beef, frozen shellfish and other shellfish products- non-citrus fresh fruit, sugar, coffee and nuts (Table 25).

TABLE 25
US-BRAZIL BILATERAL TRADE FLOWS

Groups of Products	US Exports to Brazil (US$ 1,000)		Brazilian Exports to US (US$ 1,000)		Trade Balance (US$ 1,000)		Share in Food Trade: Average 2001-2002 (%)	
	2001	2002	2001	2002	2001	2002	US-Brazil	Brazil-US
Grain	56,471	156,868	24,506	46,606	31,965	110,262	43.40	3.30
Agriculture	11,127	108,887	1,464	3,331	9,663	105,556	24.40	0.20
Soybean	25	67	1,242	662	-1,218	-595	0.00	0.10
Corn	793	5,945	173	1,409	620	4,536	1.40	0.10
Wheat	9,928	95,763	0	0	9,928	95,763	21.50	0.00
Others	381	7,111	48	1,260	332	5,851	1.50	0.10
Food Industry	45,344	47,982	23,042	43,275	22,302	4,706	19.00	3.10
First processing	44,951	47,804	16,362	34,794	28,589	13,010	18.90	2.40
Second processing	393	178	6,681	8,481	-6,287	-8,304	0.10	0.70
Meat	22,367	18,585	302,767	394,519	-280,400	-375,934	8.30	32.80
Beef and Pork	11,963	13,882	120,683	182,402	-108,720	-168,521	5.30	14.20
Poultry	1,735	1,014	0	0	1,735	1,014	0.60	0.00
Fish and Seafood	7,714	3,313	155,488	199,340	-147,774	-196,027	2.20	16.70
Others	955	377	26,596	12,777	-25,641	-12,400	0.30	1.90
Dairy	8,355	5,846	379	1,656	7,977	4,190	2.90	0.10
Coffee and Tea	933	830	43,994	39,843	-43,061	-39,013	0.40	3.90
Sugar Industry	37,254	17,730	152,919	144,883	-115,665	-127,153	11.20	14.00
Alcohol	12,476	18	4,400	7,906	8,076	-7,888	2.50	0.60
Sugar	13,715	4,483	83,326	58,669	-69,611	-54,186	3.70	6.70
Chocolate	8,301	6,702	40,942	45,707	-32,640	-39,005	3.10	4.10
Non-chocolate confec.	2,762	6,527	24,252	32,601	-21,490	-26,074	1.90	2.70
Vegetables and Fruits	18,820	18,943	309,079	378,688	-290,259	-359,745	7.70	32.30
Agriculture	8,019	11,219	181,135	229,081	-173,115	-217,861	3.90	19.30
Vegetables	5,967	9,321	1,304	1,363	4,663	7,958	3.10	0.10
Fresh fruit	2,052	1,898	179,831	227,717	-177,779	-225,819	0.80	19.20
Food Industry	10,800	7,723	127,944	149,607	-117,144	-141,884	3.80	13.00
Nuts	2,812	1,428	94,849	85,050	-92,036	-83,622	0.90	8.50
Agriculture	2,625	1,364	88,754	80,655	-86,130	-79,291	0.80	8.00
Food Industry	188	64	6,095	4,395	-5,907	-4,331	0.10	0.50
Others	65,276	58,989	51,871	55,348	13,404	3,641	25.30	5.00
Agriculture	28,954	25,025	6,960	15,445	21,994	9,580	11.00	1.10
Food Industry	36,322	33,965	44,912	39,903	-8,590	-5,938	14.30	4.00
Agri-food system	212,289	279,220	980,365	1,146,593	-768,076	-867,373	100.00	100.00
Agriculture	51,658	147,325	322,307	368,354	-270,649	-221,029	40.50	32.50
Food Industry	160,631	131,895	658,058	778,239	-497,427	-646,344	59.50	67.50
Total	*12,898,998*	*10,285,795*	*14,189,602*	*15,354,008*	*-1,290,603*	*-5,068,214*	*2.10**	*7.20**

Note: * Share of the agri-food system in total trade between the US and Brazil.

Source: USITC and SECEX/MDIC.

Table 26 presents data showing the relevance of the United States and Brazil to each other's total trade flows, discriminated by product groups. As mentioned at the start of this section, the United States absorbs a quarter of Brazil's total exports and is responsible for a fifth of the country's total imports when all products are taken into account. When Brazil's importance to US imports and exports are weighted by the relative size of the US economy, the figures are almost the same. On the other hand, the United States depends relatively less on the Brazilian economy, since it trades with a much wider range of countries. The relevance of the food system in US-Brazilian trade is below average for all sectors. The US share of Brazilian food imports and exports, and Brazil's share of total US food exports, are about a third of the respective shares for all sectors. The sole exception is Brazil's share of US total food imports, which at 2.6% is twice the average level.

TABLE 26
RELEVANCE OF BILATERAL TRADE: SELECTED PRODUCT GROUPS

Groups of Products	**Relevance of Brazil to US Trade** (%)*				**Relevance of US to Brazilian Trade** (%)*			
	Exports		*Imports*		*Exports*		*Imports*	
	2001	2002	2001	2002	2001	2002	2001	2002
Grain	0.2	0.7	0.5	0.9	0.4	0.7	3.2	9.0
Meat	0.2	0.1	2.2	2.8	8.9	10.4	4.5	3.9
Dairy	0.7	0.5	0.0	0.1	1.5	4.0	4.5	2.3
Coffee and Tea	0.2	0.2	5.7	5.1	3.0	2.8	12.4	13.3
Sugar Industry	2.6	1.5	5.6	4.8	5.7	5.6	20.1	9.4
Vegetables and Fruits	0.3	0.3	3.1	3.5	22.1	23.1	3.3	4.1
Nuts	0.2	0.1	9.3	7.5	75.7	70.0	9.7	6.9
Others	1.0	0.9	0.6	0.7	9.3	12.6	17.3	13.6
Agri-food system	0.4	0.5	2.3	2.6	6.2	6.9	5.9	7.8
Agriculture	0.2	0.6	2.0	2.2	4.5	5.0	2.9	8.4
Food Industry	0.5	0.5	2.4	2.7	7.7	8.5	8.7	7.2
Total	*1.8*	*1.5*	*1.2*	*1.3*	*24.4*	*25.7*	*23.2*	*21.8*

Note: * Equivalent to bilateral exports or imports of selected product groups divided by the total exported or imported by each country.
Source: USITC and SECEX/MDIC.

Bilateral trade flow analysis by product group gives some striking results. The United States alone accounts for 70% of Brazil's total nuts exports. Additionally, the United States is responsible for almost 7% of Brazil's nut imports. Nut is the product group for which bilateral trade is most intense. The United States is also important in Brazilian exports of fruit and vegetables and meat products, with 23.1% and 10.4% of Brazil's total exports respectively in 2002. Disaggregated data analysis identifies some Brazilian products that are oriented to US markets, such as shellfish (shrimp) and fresh fruit. Although these are not important sectors in the Brazilian food system, they have successfully developed export markets in the United States. Consequently, the FTAA may elevate these sectors among the most dynamic in the Brazilian food system.

The sugar and coffee and tea industries merit additional comments. The US share of Brazilian coffee and tea exports is quite small, although these products account for about 5% of total US

imports. In both the sugar and the coffee and tea industries -where Brazil is a major world player- the US shares of Brazilian imports are above the average for the entire food system. Although these shares are about 10%, the absolute value is not significant, as Brazilian coffee and tea imports are rather small.

Tariff and Non-Tariff Barriers

Tariff and non-tariff barriers are used differently by Brazil and the United States. Whereas the former generally levies higher average tariffs, the latter imposes lower average tariffs but with higher standard deviation. Moreover, Brazil mainly uses *ad valorem* tariffs, in contrast to the US reliance on other forms of protection against imports, including specific lump-sum tariffs, quotas and non-tariff barriers such as SPS restrictions and direct subsidies to domestic agricultural production. Consequently, the United States tends to be more open to international trade while heavily protecting selected industries against foreign competition.

Table 27 summarizes the available information supporting the distinctions drawn between the United States and Brazil. Tariff rates applied to agri-food industries, including tobacco and textiles, are higher than the average in both countries. Tariff rates, however, are on average more than three times higher in Brazil than in the United States. In addition, the standard deviation of agri-food industry tariff rates levied in the United States is twice as high as in Brazil. This suggests that US tariff rates are selectively used to protect specific domestic industries. Indeed, the maximum tariff rate reaches 350% in the United States versus 55% in Brazil. It is worth mentioning that both countries operate with average tariff rates below the world agriculture tariff rate, which averages 62% (Gibson, *et al*. [2001]).

TABLE 27
SUMMARY OF TARIFF SCHEDULES FOR BRAZIL AND THE US

	Brazil		US	
	Total	*Agri-Food*	*Total*	*Agri-Food*
Number of items	9,408.0	1,165.0	10,311.0	2,102.0
Average tariff rate (%)	28.8	34.4	5.6	10.1
Standard deviation	10.5	12.2	12.9	25.6
Maximum tariff rate (%)	55.0	55.0	350.0	350.0
Minimum tariff rate (%)	0.0	0.0	0.0	0.0

Source: FTAA Hemispheric Database in Jank *et al*. (2001).

As Jank, *et al*. ([2001] p. 115) point out, the US strategy of "chirurgic protection impacts directly the main export products of the Brazilian agri-system". More specifically, US barriers to trade affect Brazilian exports of sugar by means of quotas; orange juice by means of a specific tariff; and soybean oil by means of tariff escalation. Unsurprisingly, Brazil accounts for a small share of US imports and domestic consumption of sugar, orange juice and processed grain products. Monteagudo and Watanuki [2003] estimate that both US and Brazilian agricultural exports to the Western Hemisphere would increase by 12% and 20% respectively in the case of tariff elimination,

particularly in processed food. US exports would increase mainly to non-NAFTA partners, which are already more open to trade within the bloc. The elimination of domestic support and export subsidies would have a smaller impact on trade, increasing exports by less than 1% (Monteagudo and Watanuki [2003] pp. 13-14).

US non-tariff barriers mainly affect the Brazilian meat (beef, pork and poultry) and fruits sectors. The trade flow analysis, however, does not provide evidence that these non-tariff barriers significantly affect trade between Brazil and the United States. US non-tariff barriers constrain Brazilian exports of fresh, but not processed, meat. In addition, Brazil is particularly important in US fresh fruit imports, indicating that non-tariff barriers are not effectively deterring Brazilian exports.

Finally, the analysis of trade flows does not indicate a significant effect of tariff escalation in US-Brazilian trade.[2] Both countries mainly trade processed products, despite the fact that they are net exporters of agricultural commodities. In other words, tariff escalation does not imply significant restrictions on value added product trade in US-Brazilian trade.

[2] This conclusion is restricted to US-Brazilian bilateral trade. Monteagudo and Watanuki [2003] show that processed food exports would benefit more from tariff elimination than primary agricultural goods.

V. FOREIGN DIRECT INVESTMENT AND INTERNATIONAL MERGERS AND ACQUISITIONS

This section analyzes secondary data on FDI and international mergers and acquisitions (M&As) in the Brazilian and US food industries in the 1990s. FDI is defined as "the act of purchasing an asset and at the same time acquiring control of it" (Sodersten and Reed [1994] p. 501). In other words, FDI is motivated by a desire to control the use of acquired foreign assets. Hence FDI is distinct from portfolio investment, which is motivated by the expected return on investment rather than control over assets. In general, multinational companies use FDI to circumvent trade barriers, gain access to less expensive production resources, and tailor products to local tastes in foreign markets.

FDI may be effected through the establishment of a new business enterprise ("greenfield" investment) or through investments in already established businesses by means of international M&As. According to Bolling, Neff and Handy [1998], only 20% of FDI in the US food industry is through greenfield investment. The same trend is documented in Farina and Viegas [2002], who observe that the most common strategy of multinational food companies entering the Brazilian food market is through M&As. As a result, the new entrant is able to adapt its products to local consumption habits and rapidly gain market share.

This study uses data from the US Department of Commerce to analyze FDI in US food processing industries. The Department of Commerce considers FDI as an investment higher than 10% in a foreign enterprise, since such an investment gives the investor some degree of control over acquired assets. This study uses two main measures of FDI: direct investment position and sales. Direct investment position data are cumulative (stock) data that measure the total outstanding level of FDI at historical cost. The investment position is equivalent to the total year-end book value of parent companies' equity in, and net outstanding loans to, their foreign affiliates. The sales data are collected from the income statements of parent companies and their foreign affiliates. Similar data are used to analyze FDI by US companies in Brazil (and elsewhere in the world).

To analyze FDI into Brazil, the study uses data from the Brazilian Central Bank, which conducted censuses of foreign capital in 1995 and 2000. The Brazilian data are comparable to US data since survey respondents include all organizations with foreign capital totaling more than 10% of voting stock, or more than 20% of total capital. The census comprised 6,322 Brazilian affiliates of foreign companies in 1995 and 11,404 in 2000 (Banco Central do Brasil [2001]). This study also uses data from a variety of sources to examine other aspects of FDI in Brazil, as reported in Farina and Viegas [2002].

Foreign Direct Investment in US Food Manufacturing Industries

Table 28 shows FDI in the US food processing industry by foreign companies (that is, inward FDI) for the period 1990-2000. Total inward FDI in US food manufacturing industries reached almost US$24 billion in 2000, which is equivalent to 2% of total FDI in all industries and 5% of FDI in the manufacturing sector. The total stock of FDI in the United States has more than tripled since 1990 in all industries and in the manufacturing sector. FDI in food manufacturing, however, grew by 27% between 1990 and 1997 and then declined to the levels of the early 1990s by 2000.

When the data are broken down by sub-sectors, the beverages, bakery and dairy sectors are the main recipients of FDI among US food manufacturing industries.

TABLE 28
FOREIGN DIRECT INVESTMENT IN US FOOD INDUSTRIES, 1990-2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Direct Investment Position (US$ billion)										
All Industries	394.91	419.11	423.13	467.41	480.67	535.55	598.02	681.84	778.42	955.73	1,214.25
All Manufacturing	152.81	157.12	160.36	168.15	189.46	214.50	245.66	270.13	333.23	385.25	479.85
Food Manufacturing	22.54	23.93	23.77	22.78	21.41	27.03	28.09	28.74	22.12	18.86	23.98
Grain mill	7.75	8.61	8.71	7.92	5.89	8.64	1.60	1.55	6.84	0.90	0.99
Bakery	0.93	0.92	2.14	2.12	1.74	1.63	0.67	0.66	1.47	5.81	6.22
Beverages	9.15	9.13	6.72	7.61	7.83	10.10	10.54	12.66	5.17	4.38	6.81
Meat	0.16	0.16	0.05	0.02	0.91	0.81	0.65	0.39	0.05	0.16	0.19
Dairy	1.10	1.32	1.27	0.82	0.68	0.63	0.59	1.15	1.42	1.17	2.42
Fruits and vegetables	0.47	0.57	0.50	0.52	0.57	0.51	7.72	6.32	0.89	0.94	0.89
Other foods	2.99	3.24	4.39	3.76	3.80	4.70	6.31	6.01	6.28	5.52	6.47
	Sales (US$ billion)										
Food Manufacturing	44.99	44.26	46.80	45.77	46.77	49.23	53.99	48.44	49.82	46.56	47.39
Grain mill	n.a.	n.a.	11.99	11.58	11.74	12.39	6.48	9.56	9.20	7.05	7.11
Bakery	4.18	n.a.	4.94	3.90	4.33	4.55	3.63	12.68	12.78	12.42	11.90
Beverages	6.16	13.37	14.02	6.65	6.83	7.18	7.89	n.a.	n.a.	n.a.	n.a.
Meat	0.88	n.a.	1.50	1.32	1.38	1.80	3.43	3.01	2.30	1.56	1.88
Dairy	6.72	n.a.	6.05	6.00	6.10	6.22	5.07	5.53	6.46	5.40	6.37
Fruits and vegetables	n.a.	n.a.	1.25	1.13	1.16	1.31	8.71	1.36	1.70	1.82	1.65
Other foods	16.32	n.a.	9.05	15.18	15.24	15.81	18.78	13.26	14.01	14.49	14.73

Source: US Department of Commerce, Bureau of Economic Analysis, Foreign Direct Investment in the United States.

Table 28 also reveals that US affiliates of foreign food processors generated US$47 billion in food product sales in the United States in 2000, after peaking at US$54 billion in 1996. This represents 11% of the food industry's total value of shipments. In other words, the aggregate market share of foreign companies is about 11% of the US food industry. Foreign-owned multinational food processing companies such as Nestlé, Unilever, Danone and Parmalat hold prominent market share positions in US food industries.

According to Bolling and Somwaru [2001], European companies, mostly from the United Kingdom, dominate FDI in US food manufacturing, with over 70% of total foreign company food sales. European investments in the United States are broad-based, including wine, dairy products, chocolate products, frozen and canned foods, and grain products. Japanese companies generated sales of US$5.3 billion in 1998, mostly by producing and marketing ethnic foods in the United States, such as noodles, surimi and soy sauce. Canadian multinationals generated US revenues of US$4.6 billion in 1998, with investments concentrated in fruit juices and frozen foods. Among Latin American countries, only Mexican food companies have substantial investments in US food industries. More recently, Brazilian companies invested in Florida citrus groves and processing plants (see the case study below).

Inward FDI in US food processing industries is mainly through cross-border M&As. Table 29 shows Food Institute data on M&A activity in the US food business for the years between 1996 and 2002, grouped by the acquiring firm's category. Following a flurry of transactions in the late 1990s, the number of food system M&As has declined since 2000. Food industry transactions totaled 417 in 2002, the third lowest number in the past 20 years. M&A transactions between food retailers, restaurants, food operators and food processors all fell in 2002. It appears that the merger wave of the 1990s, which was fueled by undervalued stock prices, has come to an end as acquiring firms focus on executing the deals made during the consolidation wave. Table 29 also shows foreign acquisitions of US firms by Canadian and other foreign companies. After reaching a peak of 63 cross-border transactions in 2000, acquisitions of US food firms by foreign companies decreased in subsequent years to 44 transactions in 2002. In the last three years of available data, the percentage of foreign acquisitions stood at about 10% of the total number of M&A transactions in the US food business.

TABLE 29
NUMBER OF MERGERS AND ACQUISITIONS IN THE US FOOD SYSTEM, 1996-2002

Category	2002	2001	2000	1999	1998	1997	1996
Agricultural Cooperatives	4	6	6	7	12	3	4
Brokers	3	6	4	16	14	22	14
Diversified Firms	28	22	24	12	20	11	12
Food Processing Firms:	104	146	172	229	230	186	139
Bakers	11	8	8	18	19	20	8
Brewers	1	3	3	5	6	5	2
Confectioners	5	6	4	4	5	7	4
Diversified Food Processing Firms	42	67	86	112	140	103	96
Dairy Processors	11	12	19	24	27	15	4
Fruit and Vegetable Processors	23	33	18	32	n.a.	n.a.	n.a.
Meat Processors	4	5	9	18	14	12	10
Poultry Processors	0	6	11	6	12	8	4
Seafood Processors	6	3	10	4	3	7	4
Snack Food Processors	1	3	4	6	4	9	7
Investment Firms/Banks	42	26	29	37	26	n.a.	n.a.
Packaging and Equipment Suppliers	13	28	52	28	46	13	19
Raw Product Suppliers	0	10	16	28	44	31	28
Restaurants and Food Service	48	61	91	112	140	127	108
Retailers:	26	45	53	66	67	54	43
Convenience Stores	2	9	11	11	10	6	4
Supermarkets	19	27	24	34	39	25	20
Others	5	9	18	21	18	23	19
Soft Drink Bottlers	16	14	15	30	20	17	8
Sugar Refiners	1	0	0	0	3	1	1
Wholesalers:	35	40	48	63	71	76	30
Food Service	16	18	28	31	38	36	10
Grocery	19	22	20	32	33	40	20
Foreign Acquisitions of US Firms:	44	50	63	41	54	54	53
By Canadian Firms	11	10	13	7	15	18	4
By Other Firms	33	40	50	34	39	36	49
E-commerce	7	24	n.a.	n.a.	n.a.	n.a.	n.a.
Unclassified	46	38	68	84	66	136	77
Total	*417*	*516*	*641*	*753*	*813*	*734*	*538*

Source: Food Business Mergers and Acquisitions, Food Institute.

Foreign Direct Investment Abroad by US Multinational Companies

Table 30 shows FDI data for US companies abroad (outward FDI) for the period 1990-2000. FDI in foreign food manufacturing affiliates of US firms reached almost US$36 billion in 2000. Outward FDI by food processors represent 10% of total FDI in all manufacturing industries. In addition, outward FDI is considerably higher than FDI by foreign firms in the US food industry. FDI abroad by US food processors more than doubled between 1990 and 2000, and surpassed inward FDI in 1993.

TABLE 30
FOREIGN DIRECT INVESTMENT BY AFFILIATES OF US FIRMS, 1990-2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Direct Investment Position (US$ billion)										
All Industries	430.52	467.84	502.06	564.28	612.89	699.02	795.20	871.32	1,000.70	1,173.12	1,293.43
All Manufacturing	170.16	179.23	186.29	192.24	201.00	243.95	270.29	278.45	290.07	306.16	353.55
Food Manufacturing	15.57	17.15	21.14	25.86	24.89	28.90	31.02	32.77	35.30	34.23	35.93
Grain mill and bakery	4.18	4.48	4.77	5.12	5.48	6.47	5.91	5.32	5.22	5.54	5.85
Beverages	3.08	4.34	5.79	8.11	8.59	8.76	10.42	12.03	15.39	12.94	13.40
Meat	0.51	0.30	0.31	0.33	0.37	0.49	0.71	1.53	1.63	1.25	1.20
Dairy	0.49	0.73	0.99	1.29	1.07	0.89	1.19	0.67	0.58	0.43	0.45
Fruits and vegetables	2.33	2.70	3.05	2.94	2.19	2.66	3.21	3.51	3.65	2.73	3.15
Other foods	4.99	4.60	6.24	8.07	7.18	9.63	9.59	9.71	8.85	11.33	11.88
	Sales (US$ billion)										
Food Manufacturing	75.96	82.34	87.58	95.36	104.85	113.17	122.98	127.71	133.14	94.36	94.10
Grain mill and bakery	20.40	21.54	21.29	22.37	23.72	22.20	23.72	25.20	27.45	n.a.	28.23
Beverages	18.51	19.83	21.94	25.25	34.13	36.96	35.54	39.19	42.13	n.a.	n.a.
Meat	1.46	1.80	n.a.	n.a.	3.18	4.98	4.19	n.a.	n.a.	n.a.	n.a.
Dairy	5.00	4.71	n.a.	7.06	4.53	4.09	4.31	n.a.	n.a.	n.a.	n.a.
Fruits and vegetables	5.61	6.70	7.13	7.29	7.32	7.99	8.86	9.53	9.80	n.a.	11.45
Other foods	24.98	27.76	29.88	n.a.	31.97	36.94	46.37	43.44	42.54	n.a.	25.26

Source: US Department of Commerce, Bureau of Economic Analysis, US Direct Investment Abroad.

US investments in food manufacturing abroad are not concentrated in any particular product. Sub-sector specific data reveal that US food processors have substantial direct investment positions abroad in the beverages, grain mill, bakery, and fruit and vegetable manufacturing industries (Table 30). FDI has created prominent US multinational corporations including ADM, Cargill, Kraft Foods, General Mills, Coca Cola Co. and Tyson Foods. Indeed, US FDI is more effective at generating overseas revenues than exports. FDI by US food processors generated an estimated US$94 billion in sales in 2000, compared with US$30 billion generated by processed food exports (Bolling and Somwaru [2001]).

Nearly 50% of the direct investment position held by US food processors is located in the European Union (EU) (Table 31). Outward food FDI into the EU grew four-fold from US$3.7 billion in 1980 to US$16.3 billion in 2000. Within Europe, the United Kingdom, Germany, the Netherlands and France are the major recipients of US food industry FDI. The EU has been a magnet for US

direct investment because it has affluent consumers with high incomes and relatively similar food tastes. In addition, tariffs for many food products are sufficiently high to make it more profitable for multinational companies to invest in processing facilities within the EU than to export. About 30% of US direct investment in food processing industries is in Canada and Mexico. NAFTA has fostered both trade and FDI among the participating countries, with exports and investment in Mexico doubling in the early 1990s (Bolling and Somwaru [2001]).

TABLE 31
US FOREIGN DIRECT INVESTMENT ABROAD IN FOOD PROCESSING BY REGIONS, 1980-2000

Region	1980	1985	1990	1995	2000
			Direct Investment Position (US$ billion)		
EU (15)	3.7	4.3	7.5	13.1	16.3
NAFTA	2.2	2.1	3.6	8.1	9.8
MERCOSUR	0.6	1.0	1.3	3.7	2.7
Brazil	0.5	0.7	1.0	2.1	1.6
Other	1.8	1.9	3.2	7.5	7.1
Total	8.3	9.3	15.6	32.4	35.9
			Share of Total (%)		
EU (15)	44.6	46.2	48.1	40.4	45.4
NAFTA	26.5	22.6	23.1	25.0	27.3
MERCOSUR	7.2	10.8	8.3	11.4	7.5
Brazil	6.0	7.5	6.4	6.5	4.5
Other	21.7	20.4	20.5	23.1	19.8
Total	100.0	100.0	100.0	100.0	100.0

Source: US Department of Commerce, Bureau of Economic Analysis, US Direct Investment Abroad.

The creation of MERCOSUR between Argentina, Brazil, Paraguay and Uruguay in 1991 spurred FDI into the region. The advent of MERCOSUR, coupled with economic and political stability and rising per capita incomes in the region, caused US food processors to redirect their investments. US FDI into MERCOSUR food processing industries almost tripled between 1990 and 1995, and reached a peak of US$4 billion in 1996. Since then the investment position of US food companies in MERCOSUR has declined, in both nominal and relative terms, as a result of currency crisis and macroeconomic instability in the region. US FDI in the Brazilian food industry followed a similar pattern. Table 31 shows that US investment in Brazilian food industries increased substantially in the early 1990s, reaching US$2.9 billion by 1996 (Bolling, Neff and Handy [1998]). Following currency devaluations and low national income growth rates, the direct investment position of US food processors in Brazil decreased to US$1.6 billion in 2000, which represents 5% of their total outward FDI.

FDI in Brazilian Food Manufacturing Industries

During the 1990s, Brazil increased its participation in the global economy as a result of structural changes -including economic liberalization, industry deregulation, and privatization- and the macroeconomic stability introduced by the Real Plan. Increased participation in the global economy is reflected in both the evolution of foreign trade and direct investment. Between 1996 and 2000,

FDI flows into Brazil totaled US$113 billion, second only to China among developing nations. The 11,404 Brazilian affiliates of multinational companies employed 1.7 million workers and generated US$232 billion in sales in 2000 (Table 32). Their direct investment position in Brazil reached US$103 billion in 2000, up from US$42 billion in 1995. Between 1995 and 2000, exports by companies with foreign capital increased from US$22 to US$33 billion, equivalent to 60% of total Brazilian exports.

TABLE 32
FOREIGN DIRECT INVESTMENT IN BRAZIL, 1995 AND 2000

	2000	1995
	Total (All Sectors)	
Number of Employees	1,709,555	1,447,385
Direct Investment Position (US$ million)	103,015	41,696
Sales (US$ million)	231,705	188,903
Exports (US$ million)	33,249	21,744
	Food and Beverages Industry	
Number of Employees	136,621	153,024
Direct Investment Position (US$ million)	4,619	2,828
Sales (US$ million)	17,186	16,709
Exports (US$ million)	4,952	2,313

Source: Brazilian Central Bank, Census of Foreign Capital.

Table 32 also shows FDI data for the food and beverages processing industries. The direct investment position of food multinationals in Brazil increased from US$2.8 billion to US$4.6 billion between 1995 and 2000, despite successive currency devaluations in the late 1990s. These figures represent 7% and 4% of total FDI positions in 1995 and 2000 respectively. FDI in the Brazilian food industry originates mainly in the United States (US$1.3 billion), France (US$0.8 billion), Switzerland (US$0.5 billion), Bermuda (US$0.4 billion), and Denmark and Italy (US$0.2 billion each). Brazilian affiliates of multinational food companies generated 137,000 jobs, almost US$5 billion in exports, and sales of US$17 billion in 2000. Given the total value of food industry shipments in Brazil of US$58 billion (Table 5), the aggregate market share of foreign companies reached 30% in 2000.

Farina and Viegas [2002]) investigate the increased flow of FDI in Brazil during the 1990s, and observe that many multinationals in the food industry have chosen Brazil as their headquarters location for investments in MERCOSUR. Brazil has become an attractive location for FDI in the food industry as a result of the following factors: (i) a large domestic market with 78% of MERCOSUR's population and 62% of the region's GDP; (ii) foreign companies' interest in using Brazil as the export base to other countries in the region; (iii) macroeconomic stability in the initial period of the Real Plan; (iv) high food consumption growth rates, particularly in value-added food products; (v) tax incentives; (vi) access to raw materials from a fast growing and competitive agricultural sector; and (vii) low labor costs.

In addition to fostering FDI from developed countries, MERCOSUR also spurred an increase in trade and FDI among the group's members, particularly Argentina and Brazil. Total bilateral investment flows rose from US$2.2 billion during the 1990-1997 period to US$6.9 billion in the

late 1990s. Interestingly, investment by Argentine firms in Brazil reached US$5.4 billion, equivalent to 78% of total bilateral investment flows, between 1998 and 2000 (Bonelli [2000]). Argentine companies were very active in acquiring Brazilian food assets through M&As in the late 1990s.

According to Farina and Viegas [2002], the main form of entry for FDI in Brazil is through cross-border M&As. Data collected by KPMG on the number of mergers and acquisitions in Brazil show 2,335 transactions in all industrial sectors for the period 1992-2000. Foreign capital was present in 70% of these transactions. In 2000, 34% of the total foreign investment entering Brazil through acquisitions of national firms originated in the United States. During the same period, there were 309 M&A transactions in the food sector, accounting for 13% of the total. Foreign capital also dominates M&A operations in the food sector, with 60% of the total. Multinational companies from Argentina (Grupo Macri), the United States (ADM, Bestfoods, Sara Lee and Kraft Foods), and the EU (Unilever, Nestlé, Danone and Parmalat) were among the major acquirers of Brazilian food assets in the late 1990s (Table 33).

TABLE 33
LARGEST M&A TRANSACTIONS IN THE BRAZILIAN FOOD AND BEVERAGES INDUSTRY, 1996-2000

Year	Acquired Firm	Purchasing Firm	Nationality of Purchaser	% Acquired	Value (US$ million)
1997	Kibon SA	Unilever	United Kingdom	100	930.0
2000	Arisco	Bestfoods	United States	100	752.0
2000	Cia Antarctica Paulista	Cia Cervejaria Brahma	Brazil	100	368.6
1996	Lacta	Kraft Foods	United States	58	245.0
2000	Café União	Sara Lee Corp.	United States	100	215.8
1999	Chapeco	Grupo Macri	Argentina	100	213.0
1998	Batavia	Parmalat	Italy	51	200.0
1997	Sadia Concordia	Archer Daniels Midland	United States	100	165.0
1997	Baesa	Cia Cervejaria Brahma	Brazil	100	155.0
1997	Pepsi-Cola Engarrafadora	Cia Cervejaria Brahma	Brazil	100	150.0
1998	Juiz de Fora Bottling Plants	Embotelladora Andina SA	Chile	100	120.0
2000	Coop Central de Lacticinio	Danone	France	100	118.9
1998	Star & Arty Ingredientes	Kerry Group plc	Ireland	100	108.1
1996	Cia Antarctica Paulista	Anheuser-Busch	United States	10	105.0
1998	Pullman Alimentos	Bunge Ltd.	Argentina	100	85.0
1999	Granja Rezende SA	Sadia	Brazil	90	84.7
2000	Nitvitgov Refrigerantes SA	Embotelladora Andina SA	Chile	100	84.4
1998	Joanes Industria	Archer Daniels Midland	United States	100	64.0
1996	Frescarini (LPC/Danone)	Pillsbury	United States	100	50.0
1999	Kraft Lacta Suchard SA	Adams do Brasil	United States	100	46.7
2000	Swift Armour	Bertin	Brazil	100	36.7
1998	Refrigerantes do Oeste SA	Panamerican Beverages	Mexico	100	36.4
1997	Basilar	Canale SA	Argentina	100	26.4
1999	Adria	Canale SA	Argentina	100	15.0
1998	Leitesol	Mastellone Hermanos SA	Argentina	94	14.1
1997	Sadia Oeste	Friboi Alimentos Ltda	Brazil	100	13.8
2000	Frigorifico Batavia SA	Perdigao	Brazil	51	11.9
1999	Café Seleto	Sara Lee Corp.	United States	100	n.a.
1999	Café do Ponto	Sara Lee Corp.	United States	100	n.a.
1998	Frangosul	Doux SA	France	n.a.	n.a.
1997	Ceval	Bunge Ltd.	Argentina	n.a.	n.a.
1997	Glencore	Archer Daniels Midland	United States	n.a.	n.a.
1996	Anderson Clayton	Unilever	United Kingdom	n.a.	n.a.
1996	San Valentin	Cargill	United States	n.a.	n.a.
1996	Naturalat	La Serenissima	Argentina	n.a.	n.a.

Source: Thomson data in Farina and Viegas [2002].

Increased M&A activity in the Brazilian food sector led to a concentration of capital and denationalization (Farina and Viegas [2002]). The share of food manufacturing multinationals in the value of food shipments increased from 19% in 1996 to 27% in 2000 (Table 34). Brazilian food manufacturing industries, however, are less dependent on foreign capital in comparison to other manufacturing industries, wherein multinational firms are responsible for about 42% of the total value of shipments. Table 34 also suggests that multinational firms are likely to be more technology-intensive than domestic firms, inasmuch as their share of employment tends to be significantly lower than their share in value of shipments.

TABLE 34
MULTINATIONAL COMPANIES IN BRAZIL, 1996-2000

	1996	1997	1998	1999	2000
	Share in Value of Shipments (%)				
Total Industry	26.6	38.5	39.9	42.9	41.8
Extractive	17.7	28.2	29.0	31.2	32.7
Manufacturing	26.8	38.7	40.2	43.2	42.0
Food Manufacturing	19.2	25.4	25.2	28.1	27.0
	Share in Employment (%)				
Total Industry	15.9	23.0	23.4	23.7	23.4
Extractive	7.7	16.3	15.6	15.9	14.6
Manufacturing	16.0	23.1	23.5	23.9	23.6
Food Manufacturing	10.9	15.4	15.9	15.8	17.0

Source: PIA-IBGE, drawn up by NEIR-IE-UNICAMP.

In 1994, the top ten food companies in Brazil had a combined market share of 28%. Among these companies, five were multinational food processors (Farina and Viegas [2002]). In 2001, the aggregate market share of the top ten food companies fell slightly to 26%, but the number of multinational companies rose to eight. These eight large multinational firms controlled about 20% of the Brazilian food market, up from 13% in 1994. The only firms with Brazilian capital to feature among the top ten are Sadia and Perdigão, leaders in poultry processing and processed meat markets (Table 11).

VI. A REPRESENTATIVE CASE: TRADE, INVESTMENT AND STRATEGIC ALLIANCES IN THE ORANGE JUICE INDUSTRY

In the 1990s, the four leading firms in the Brazilian orange juice industry -Cutrale, Citrosuco, Cargill and Dreyfus- started operations in Florida by acquiring existing plants formerly operated by US companies. The explicit motivation for this strategic movement was the increasing difficulties that these firms faced in accessing the US market, the world's largest in terms of orange juice volume. Since the late 1980s, Brazilian frozen concentrated orange juice (FCOJ) exports to the United States have been declining in both absolute and relative terms. In the 1990s the United States became increasingly self-sufficient as orange production became less vulnerable to freezes, the result of the relocation of orange groves to southern Florida. Consequently, Brazilian FCOJ exports to the United States fell from roughly half of total Brazilian exports in the 1980s to less than 20% in 1996.

Three factors caused the decline in Brazilian FCOJ exports to the United States. First, FCOJ is subjected to "chirurgical protection" by the US tariff rate system. To protect Florida citrus and orange juice production, imports from outside NAFTA have to pay a specific tariff rate of US$0.297 per SSE[3] gallon for FCOJ and US$0.175 per SSE gallon for not-from-concentrate (NFC) orange juice, corresponding to an equivalent *ad valorem* tariff rate of 56.7% and 13.7% respectively (Neves, Marino and Nassar [2002]). Second, Mexican processing companies, being part of NAFTA, enjoy preferential tariff rates, which correspond to an equivalent *ad valorem* tariff rate of 30.7% for FCOJ and 6.4% for NFC orange juice. As a result, Mexican orange juice exports to the United States increased in the 1990s and displaced part of Brazilian exports.

Third, orange juice consumption in the United States has been marked by a trend towards NFC juice. The share of NFC in the US market accounts for almost 50% of total orange juice volume. There is a "natural" trade barrier in the case of NFC juice because it has more than five times the weight and volume of equivalent FCOJ, and its transportation requires greater effort in quality control. It is noteworthy that, logistics barriers notwithstanding, Brazil began exporting NFC to the United States in 2002, at approximately 3% of FCOJ exports.

Evolution of the Brazilian Orange Juice Industry

The orange juice industry began operations in Brazil in 1962, when a severe freeze in Florida caused a shortage in the US market. At the time there was no significant international market for FCOJ and Brazilian production was thus targeted at the US market. US companies arrived in Brazil with capital and technology, and formed strategic alliances with packinghouse owners with access to orange growers.

Forty years later, the Brazilian orange juice industry is the largest in the world. Two family-owned companies founded in the 1960s have a combined 50% share of the industry's total crushing capacity. In addition, two multinational processors are important industry players (Table 21). The Brazilian orange juice industry structure is affected by the capital goods industry, particularly the

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[3] Single Strength Equivalent corresponds to a gallon at 11.8° Brix.

US-based company FMC, which has a plant devoted to citrus processing in the center of the Brazilian orange juice production region.

The Brazilian orange juice industry is cost competitive. Brazilian FCOJ exports account for 85% of total international trade despite high tariff rates in major export markets -the EU, the United States and East Asia-. Its competitiveness is based on low input costs, efficiency in plant operation and the bulk transportation system, which comprises tank-farm trucks, vessels and dedicated port terminals in each export destination. The bulk transportation system alone allows for cost savings of 15% of final FCOJ price relative to the use of the traditional 200-liter barrel. The Brazilian industry therefore has its main competitive advantage in logistics, as competitors do not have sufficiently large scale to exploit bulk transportation systems. Even the US industry does not extensively use bulk transportation, given that orange juice deliveries are dispersed in several distribution channels.

Foreign Direct Investment: Brazilian Companies in Florida

The acquisition of US plants by Brazil-based processors is part of their growth strategy in response to the self-sufficiency of US domestic production. However, this movement caused a rearrangement of the US orange juice production chain and was beneficial to the beverage companies that were former owners of the acquired plants.

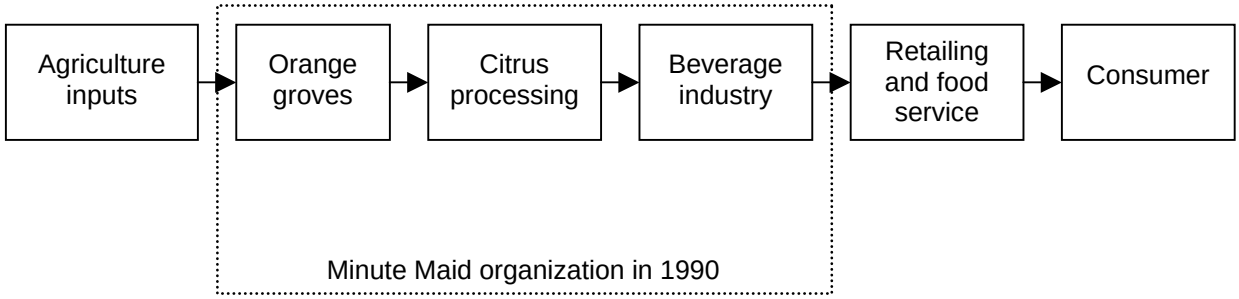
The orange juice industry is part of the beverage production chain. Some beverage products use orange juice -frozen, concentrated or pasteurized- as a raw material input. The final product may be ready-to-drink orange juice, other beverages that use orange juice in their blends, or concentrated juice that is prepared at home by consumers or at restaurants by food services. The recent acquisitions of US crushing plants by Brazilian firms are better understood as a reorganization of this production chain in the United States, with possible emulation in other countries.

In the early 1990s, the major US orange juice processors were large and diversified beverage companies, including Coca-Cola (Minute Maid) and PepsiCo (Tropicana). Their main business is ready-to-drink beverages that require specific competence and expertise in marketing and branding. By means of diversification, these beverage companies are able to explore economies of scope in an extensive line of products. In the juice business, they need a reliable source of orange juice -NFC and FCOJ- both in terms of regularity and quality, in order to keep up with their branding efforts. Until the early 1990s, transaction costs reasoning explains why Coca Cola and Pepsi operated their own citrus processing plants, which were dedicated assets to the beverage industry. In addition to the vertically integrated beverage companies, smaller independent citrus processors sold orange juice to beverage companies or retail chains by means of supply contracts. Figure 6 shows the orange juice production chain, from agricultural inputs to the final consumer. Until 1990, the largest beverage companies, such as Minute Maid and Tropicana, operated in the beverage industry, citrus processing and, in some cases, orange groves.

At the start of the 1990s there was a transformation in the US orange juice industry. The family-owned Brazilian company Cutrale acquired Minute Maid plants. Subsequently, Citrosuco bought the citrus processing plant of Alcoma, a citrus grower that used to be vertically integrated in processing. Then Cargill -whose citrus department is based in Brazil- also entered the Florida

market, acquiring the Procter and Gamble plant. Dreyfus followed and bought the processing plant of Winter Garden (Fernandes [2003]). It is noteworthy that the Brazilian companies, all of which have their own orange groves in Brazil supplying 30% of their raw input needs, are not vertically integrated towards orange production in Florida.

FIGURE 6
ORANGE JUICE PRODUCTION CHAIN



The distinguished efficiency of Brazilian companies in orange processing partially explains these acquisitions. In addition, this capability could not be fully explored with plants located in Brazil, as trade barriers protect Florida production. What is remarkable in the orange juice case, however, is that Brazilian companies and the US beverage industry are not in essence competitors. Instead of competing, Cutrale and Minute Maid developed a strategic alliance, which is the basis for the vertical disintegration in the US orange juice production chain in the 1990s. Counting on a reliable and efficient orange juice supply, beverage companies shifted their focus to their primary business in order to fully explore their competencies in marketing -particularly in blends, branding and distribution channels- and the economies of scope in their beverage product line. Consequently, the acquisition of US citrus processing plants by Brazilian companies is part of the orange juice chain restructuring, which led to a more efficient form of organization.

The effects of the recent acquisitions by Brazilian companies are also evident in vertical coordination strategies between orange growers and processors. Table 35 shows the incidence of three types of vertical coordination arrangements and captures a dramatic transformation in the backward vertical integration strategies of Florida processors. In 1990, the dominant mode of organization was grower-processor integration, followed by non-integrated processors and cooperatives. In contrast, focused, non-integrated orange juice processors are the dominant players, with a lower participation of vertically integrated grower-processors. This industry arrangement differs from that in Brazil, where processors have their own orange groves.

According to Fernandes [2003], several factors explain different vertical coordination patterns in Brazil relative to the United States, such as industry concentration, the risk of drought, and the different contractual design features (such as payment by pound solids in US and by boxes delivered in Brazil), which are more effective in the United States because of interest alignment between processors and orange growers.

Vertical alliances between orange juice processors and beverage companies may be replicated in other countries, including Brazil, where the ready-to-drink orange juice segment is growing fast

but is still rather small. In order to explore this emergent market segment, Brazilian orange processors have established vertical alliances with dairy firms and retailers with competitive advantages in branding and distribution of perishable goods, such as milk and NFC orange juice. It is likely that this type of alliance will progressively incorporate beverage companies with international brands such as Minute Maid.

TABLE 35
BACKWARD VERTICAL COORDINATION IN FLORIDA CITRUS PROCESSORS

Type of Vertical Coordination	1989-1990 Season	2001-2002 Season
Grower-Processor	Alcoma B&W Canning Berry Caulkins Citrus Service Frostproof Groves Indian River Foods Lykes-Pasco Minute Maid (two plants) Orange-Co Silver Springs	Duda Southern Gardens
Cooperative	Citrus World Golden Gem Holly Hill Ocean Spray Winter Garden	Citrus World (two plants) Holly Hill Ocean Spray
Processor	Adams Packing Ardmore Farms B.C. Cook Caribbean Select Citrus Belle Erly Juice Juice Bowl Procter and Gamble Sun Pac Sun Pure Tropicana (two plants)	Cargill Citro Pure (three plants) Citrosuco Cutrale (two plants) Dreyfus (two plants) Peace River Silver Springs Tropicana (two plants)

Source: Fernandes [2003].

The orange juice case provides an interesting example of the interaction between trade, FDI and strategic alliances among US and Brazilian companies. The impact of the FTAA will largely depend on the effective removal of trade barriers for FCOJ in the United States. Without such trade barriers, Brazilian companies may reduce orange juice production in Florida and substitute for imports originating from their Brazilian operations. Nevertheless, the strategic alliance between orange juice processors and beverage companies will probably expand to other countries in the region.

VII. SUMMARY AND CONCLUSIONS

This study has assessed the potential effects of the implementation of the FTAA on bilateral trade and FDI in Brazil and the United States, focusing on the food industry. To that end the report presented an overview of the food industry's size and structure in the two countries, and discussed in greater depth specific food industry sub-sectors including grains, meat, dairy, coffee, sugar and orange juice.

The food industry plays an important economic role in both countries. In absolute terms, the US food industry is larger than its Brazilian counterpart. In 2000, the US food industry generated US$165 billion in value added and US$420 billion in value of shipments. The 22,000 US food processors employed almost 1.5 million workers in the same year. In 2000 the 20,000 Brazilian food companies employed almost 1 million workers and generated US$20 billion in value added and US$58 billion in total value of shipments. In relative terms, however, Brazil's food industry is more important to the national economy than its US counterpart. The food and tobacco industries account for 9% of Brazil's GDP but just 2% of US GDP. Additionally, the food system represents 26% of GDP in Brazil and 8% of GDP in the United States.

The industry structure analysis revealed that food industry markets are concentrated in both countries, but more so in the United States. In both countries, large processors generally dominate the main food industry product markets but coexist with a competitive fringe composed of smaller firms. The difference is that this competitive fringe in Brazil is more atomistic and active in informal markets. While small food companies in the United States generally operate in niche markets with differentiated, branded food products, their Brazilian counterparts thrive in commodity markets for "popular" products, where cost leadership is the predominant competitive strategy.

In addition to concentration, there is also a trend towards greater vertical coordination in the food system in both countries. Contracts and vertical integration are ubiquitous in the poultry, pork, dairy, orange juice and sugar industries. Non-market vertical coordination mechanisms are increasingly used in the grain and coffee industries, as food processors attempt to differentiate their product offerings on the basis of agricultural input quality attributes. In sum, the structural change process known as agricultural industrialization is well underway in both countries (Cook and Chaddad [2000]; Reardon and Barrett [2000]).

The study also found that the US and Brazilian food industries differ markedly in terms of profitability, geographic concentration and organizational structure. US food processors consistently outperform their counterparts in other manufacturing industries, while Brazilian food processors lag behind in profitability. In both countries the food industry is concentrated geographically near large population areas and agricultural input supply. The analysis, however, did not detect any significant relocation of food processors in Brazil. As the agricultural frontier expands into the Brazilian *cerrados*, supply-oriented food processors appear to follow. In the first step of this relocation process, grain processors build grain handling and processing capacity in the Middle-West, followed by some meat processors. Consequently, the Brazilian Middle-West region is the most dynamic in terms of food industry growth.

The most striking difference between the two countries is perhaps the dominant position of multinational food companies in Brazilian food markets. Eight of the top ten food companies in

Brazil have foreign capital, while only two multinational corporations appear in the list of the leading 30 food processors in the United States. Additionally, affiliates of foreign companies control an aggregate market share of 30% of food industry value of shipments in Brazil. In contrast, US affiliates of multinational food processors have a combined market share of 12%. US food companies such as ADM, Cargill, Kraft Foods and Sara Lee hold dominant market positions in the Brazilian food industry.

Both the United States and Brazil are large recipients of FDI in their food industries, but for different reasons. The total stock of FDI in US food processing industries is large (US$24 billion) but has decreased in absolute and relative terms since the mid-1990s. On the other hand, the FDI position of food multinational firms in Brazil is relatively smaller (US$4.7 billion), since the domestic market is smaller. The FDI position of foreign food processors in Brazil, however, increased by 65% between 1995 and 2000. Additionally, US food processors are more active than their Brazilian counterparts in FDI. This is not surprising, since US food companies are very large and have access to well-developed public equity markets. US outward FDI in the food industry surpassed inward FDI in 1993 and is still growing -a reflection of low-growth, mature food markets in the United States-.

Food industry FDI in both countries is effected mainly through cross-border M&As. The study observed significant cross-border M&A activity in the food industry in both countries during the 1990s. Foreign firms were the major acquirers of food industry assets in Brazil throughout the 1990s, being involved in 60% of total M&A transactions. Cross-border M&As contributed to the concentration and de-nationalization of the Brazilian food industry. In contrast, only 10% of total food industry M&A transactions involved an international acquirer in the United States.

FDI is likely to grow in Brazil as a result of the FTAA, increased agricultural output and the sophistication of food consumption habits. If the FTAA is approved, US food processors will be better placed than European firms to acquire food assets in Brazil. The analysis suggests that the Brazilian meat, dairy and sugar industries offer the most attractive investment opportunities for multinational food companies in Brazil. These industries are still fragmented, and domestic companies are the industry leaders. In addition, US food processors may further consolidate their food and agribusiness positions in the Brazilian grain and coffee industries. Because of their smaller size and imperfect access to growth capital, and because they do not control dominant positions in domestic markets, Brazilian food processors will probably not be active in FDI even if the FTAA comes into effect. More likely, Brazilian companies will increase agri-food exports to the United States but not FDI.

Additionally, the FTAA will probably foster inter-organizational collaboration between US and Brazilian firms in order to explore their complementary assets and competencies. Because they are large, US food companies can explore scale and scope economies and carry out high value added activities. Large US food processors have also developed global brand names and marketing expertise. On the other hand, Brazilian firms have access to lower labor and agricultural input costs. They have also developed organizational competencies for vertically coordinating the domestic agricultural production chain -including origination in the grain industry, backward vertical coordination in the poultry and pork industries, and bulk transportation systems in the orange juice industry-. These complementary resources among firms create opportunities not only for increased FDI but also for bilateral trade.

As to the potential effects of the FTAA on food industry trade, changes in the trends documented in this study depend on the complete elimination of trade barriers. Monteagudo and Watanuki [2003] estimate that tariff elimination would increase Brazilian and US agricultural exports to the Western Hemisphere by 20% and 12% respectively. Nevertheless, there are unlikely to be significant changes in trade barriers in the sectors particularly affected by tariff elimination, inasmuch as important Brazilian export products -such as sugar and orange juice- are significant domestic products in the United States and receive "chirurgical protection" by means of quotas and specific lump-sum tariffs. In addition, the FTAA will not significantly affect agri-food industry bilateral trade between the United States and Brazil, because each country's other main products compete in international markets. The removal or reduction of tariff and non-tariff barriers in the FTAA would profoundly affect the sugar, poultry meat and orange juice industries in both countries. Consequently, conflicting US and Brazilian negotiating positions on market access for those products will probably arise in the FTAA talks.

The impact of the FTAA on the dairy sector is expected to be strong because of the federal income and price support received by US dairy farmers, and of differences in public standards in the two countries. Dairy marketing and quality requirements in Brazil are more lenient, and the enforcement institutions are weak. Dairy product quality standard harmonization will require an adjustment period and sizeable private investments in Brazil.

Public Policy Recommendations

Public policies are not always Pareto improving, since they often generate winners and losers. The effective removal of trade barriers under the FTAA would foster trade flows, FDI and specialization in the affected countries. Consequently, consumers would benefit from lower food prices and higher quality products. Nevertheless, domestic production of certain food products -particularly sugar and orange juice in the United States and dairy products in Brazil- would be affected by increased foreign competition. Inasmuch as these sectors are organized by private interest groups in a more effective way than consumers, the complete removal of trade barriers is unlikely. Taking these issues into account, there follow general policy recommendations that focus on some basic principles for exploring complementary features of the US and Brazilian agri-food industries, with expected positive effects for both countries in domestic and international markets. These general guiding principles are as follows:

1. Assessment of complementary competencies among agri-food industry participants, in order to identify potential opportunities for inter-organizational collaboration -including strategic alliances, joint ventures and cross-holdings- between US and Brazilian companies.

2. Facilitation of service, resource and capital flows between the two countries as a mean to foster FDI and cross-border inter-organizational collaboration. For example, facilitate human capital mobility allowing for the combination of complementary competencies and organizational learning between US and Brazilian companies.

3. Definition of public standards related to food quality and marketing -in particular, perishable products such as dairy, meat, and fruits and vegetables-. A transition period may be necessary to allow gradual adaptation by Brazilian firms operating in a "loose" institutional environment. Public financing may also be necessary for smaller firms to make the necessary investments to comply with new public standards.

4. The adoption of private standards related to the procurement of raw or semi-processed materials by food processors and retailers may create demand for public policy on financing and contract enforcement.
5. Identification of policy alternatives for a gradual redirection of domestic production of non-competitive industries towards alternative uses of factors of production, including labor, capital, and natural resources.
6. In-depth examination of trade opportunities that are not harmful to existing domestic production, such as new agri-food products and import substitution from other countries.
7. The FTAA agenda should include negotiations on the use of anti-dumping as a trade barrier. Both Brazil and the United States have used anti-dumping measures to protect domestic industries in MERCOSUR and NAFTA respectively.

In addition to the "chirurgical protection" of certain agricultural sectors by means of trade barriers, federal income and price support programs in the United States is a particularly contentious point in the FTAA negotiations. Policy-makers interested in the positive net gains of FTAA will have to be creative in overcoming this potential "deal breaker."

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