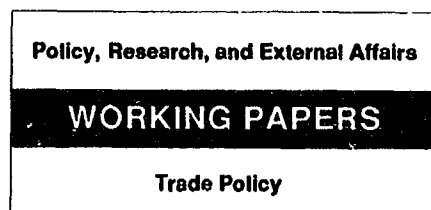


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Brazilian Frozen Concentrated Orange Juice

The Folly of Unfair Trade Cases

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and
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The main effect of antidumping actions brought against Brazilian producers of frozen concentrated orange juice has been to strengthen the oligopoly-oligopsony relationship between Brazilian producers and their U.S. partners. This limits the prospects for competition in the world market for frozen concentrated orange juice.

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This paper — a product of the Trade Policy Division, Country Economics Department — is part of a larger effort in PRE to understand the economics of the emergence of "fairness" as a standard for regulating international trade, its implications for the continued openness of the international trading system, and its continued functioning as an important vehicle for development. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Nellie T. Artis, room N10-013, extension 37947 (46 pages).

From 1965 to 1976, the United States was a net exporter of frozen concentrated orange juice; since the 1977 freeze in Florida, it has been a net importer. In 1978, the price differential between the Florida and Brazilian concentrates exceeded the tariff wedge and the Brazilian product began to displace U.S. production and, indirectly, Florida-grown oranges.

Brazil dominates the international market for frozen concentrated orange juice. By the mid-1980s, Brazil accounted for about 80 percent of world exports of the product. Brazilian producers supplied more than 94 percent of U.S. imports of the product in the 1980s and accounted for 50 percent of sales in the U.S. market. Brazil is also the main supplier in the European Community.

The Brazilian frozen concentrated orange juice industry has been able to expand rapidly despite heavy protection in its major markets — especially the United States — and erratic changes in Brazilian policies at all levels. The dynamism of the Brazilian industry is attributable to Brazil's comparative advantage and to the series of climate shocks to Florida's orange groves.

In Brazil, the industry is largely in the hands of four large firms — who sell 80 percent of their products to a few large U.S. firms (Coca Cola, Procter & Gamble, Tropicana, Pasco, and Beatrice), at significant price rebates.

Florida orange growers, beset by import competition and climate shocks, turned to unfair trade laws for protection in the early 1980s, relying on them increasingly as a substitute for safeguard actions. Because of Brazil's interventionist trade policies, the prevailing U.S. belief was that any Brazilian industry

was guilty of unfair trade practices until proven innocent.

When U.S. firms accused Brazilian producers of unfair trade, the Brazilian producers were in a bind: the imbalance between their production costs and sale prices was the result mainly of an exceptional lack of coordination among Brazilian firms struggling to secure stable input supplies. But it was seized upon by foreign producers as unfair trade. In 1986, the Brazilian industry was accused of dumping by both the United States and Australia. And unfair trade procedures in the United States, once initiated, have a high probability of resulting in an affirmative decision.

Unfair trade cases against Brazilian firms have had little direct impact on output or price levels. But apparently they promote oligopolistic coordination among Brazilian firms. To the extent that these unfair trade cases foster the market power of Brazilian frozen concentrate producers, they increase the likelihood of increased long-term welfare costs to consumers worldwide.

Unfair trade actions have had a particularly negative impact on their supposed beneficiary, the U.S. citrus industry. The antidumping cases were basically used to protect orange growers and higher-cost frozen concentrate producers at the expense of U.S. juice and soft drink processors and distributors linked by marketing arrangements to Brazilian concentrate exporters. Their effect has probably been to strengthen the oligopoly-oligopsony relationship between Brazilian producers and their U.S. partners, further hindering the prospects for competition in the world market for frozen concentrated orange juice.

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**Brazilian Frozen Concentrated Orange Juice:
A Study on the Folly of Unfair Trade Cases**

Carlos Alberto Primo Braga
Simao Davi Silber

Brazil has been the world's leading exporter of frozen concentrated orange juice since the late 1960s. The origins of the Brazilian industry go back to 1963, when the first modern plant for processing frozen concentrate was built in the state of Sao Paulo. Since then, the industry has grown dramatically as the international market for frozen concentrate has expanded. Between 1963-67 and 1983-87, Brazilian exports grew at an average yearly rate of 33.9 percent.

Only four decades ago, orange juice was a seasonal product and a luxury good. Advances in processing and packaging technologies transformed orange juice as a commodity and revolutionized the economy of the citrus sector across the world. As the taste and quality of processed juice products improved, they were rapidly substituted for fresh citrus products in industrial countries. In the United States, for example, processed citrus products accounted for 63 percent of per capita citrus consumption by 1960, up from 17 percent in 1940 (FAO 1989a, 1-3).

The Brazilian frozen concentrated orange juice industry emerged in response to this growing international demand for orange juice. The Brazilian industry, which produces a highly concentrated form of frozen juice (usually, 65 degrees Brix¹) primarily for manufacturing, grew rapidly throughout the 1960s and 1970s, playing a complementary role to the Florida processing industry. Its expansion was geared largely to the needs of the European market.

In the 1980s, however, several events significantly altered the international stature and market orientation of the Brazilian industry. First, several severe freezes in Florida damaged much of the citrus crop, allowing the Brazilian industry to overtake the Florida producers. Brazil not only expanded its market share in the United States and in other major importing

regions, but it also became the largest world producer of frozen concentrated orange juice. Second, developments in transport (bulk shipping) and storage techniques (tank farms) began to affect traditional distribution networks and to reduce the market power of Florida processors in the U.S. market (McClain, 1989).

In response, Florida orange growers and segments of the U.S. frozen concentrate industry increasingly demanded protection against foreign competition. A series of unfair trade actions were initiated against Brazilian producers during the 1980s as a safeguard device for local producers. While these actions had only a marginal impact on the output and price levels of Brazilian producers, they created incentives for oligopolistic coordination among Brazilian firms. To the extent that these unfair trade cases fostered rather than inhibited the market power of Brazilian producers, they increased long-term welfare costs for consumers around the world. This chapter analyzes the history of these unfair trade cases and their impact on the Brazilian frozen concentrated orange juice industry.

Growth of the Brazilian citrus industry

The history of the Brazilian citrus and frozen concentrate industry can be divided in three periods. From the beginning of this century until the 1960s, the citrus industry produced mainly for the fresh fruit market. Brazilian orange exports to Argentina in the second decade of the 1900s and to Europe in the 1920s suggest the early outward-orientation of the industry.² The main producing areas in the country were the states of Rio de Janeiro and Sao Paulo and the city of Rio de Janeiro. Sao Paulo, however, rapidly assumed a leading role because of its superior natural-resources endowment and infrastructure and because of direct support from the state government, which began to sponsor citrus-related research in the 1920s.

With the Great Depression and the crisis in the coffee sector in the 1930s, farmers in Sao Paulo began to move into oranges as an alternative crop.

Their export share grew from 12 percent of total Brazilian exports of 359,000 boxes (40.8 kilograms each) in 1927 to 50 percent (of 5,631,900 boxes) by 1939. In the late 1930s, however, citrus production in the state was almost completely wiped out by the citrus disease known as "tristeza." Not until 1957 did Sao Paulo recover its leading position in Brazil's citrus industry.³

The second period in the history of the industry began with the opening of the first frozen concentrate processing plant in the city of Bebedouro, Sao Paulo, in 1962. This first plant -- little more than a cottage operation -- was soon followed by several larger ones in 1963, 1964, and 1965, also in Sao Paulo. These investments in processing activities were motivated by the growing international demand for orange juice, the 1962 freeze in Florida, and expanding citrus production in Sao Paulo.

Most of the capital invested in these plants came from firms and entrepreneurs involved in exporting or importing fresh fruit or from firms in the beverage industry in the United States and Europe. The Suconasa processing plant in Araraquara, for instance, was owned by a Puerto Rican entrepreneur (Pedro Santiago) who was the first to perceive the potential of a Brazilian-based operation to supply the U.S. market. In 1967, Suconasa was acquired by Jose Cutrale, Jr., a major Brazilian orange grower and exporter, and became Sucocitrico Cutrale S.A., soon to be one of the giants of the industry. Citrosuco Paulista S.A. in Matao was the result of an association among the Pasco Packing Company (a U.S. juice producer), the Ecks Group (a major German orange juice importer), and Carl Fisher (a German immigrant, who had a fruit export company in Brazil).

Despite many initial problems, particularly, with quality control, the Brazilian frozen concentrated orange juice industry expanded rapidly (see tables 6.1 and 6.2). And, in turn, so did Brazil's citrus sector. Between 1963 and 1967, only 12 percent of the oranges grown in Sao Paulo were processed (Ferreira and Larson 1973, 13); by the first half of the 1970s, that share had increased to 62 percent and soon reached more than 80 percent, where it has remained.

In the mid-1970s, Brazilian frozen concentrate processors experienced their first systemic crisis. The worldwide recession following the first oil price shock in 1973 depressed international demand for frozen orange juice concentrate, pushing prices down by 17 percent between 1974 and 1975. The financial implications of this price drop were magnified by events in the Brazilian orange market. Some Brazilian processors were offering unusually high prices for the 1974/75 orange crop because of the aggressive behavior of the Italian firm of Sanderson, which had acquired complete control of the Cia. Mineira de Conservas processing plant in 1970. The new company, Sanderson S.A., had ambitious expansion plans, and in late 1973 it began to bid up the price of oranges for future delivery. But as the world price of frozen concentrate fell, the company was unable to honor its commitments and filed for bankruptcy in mid-1974.

Orange growers and some processing firms sought government intervention in the sector. Some also accused Citrosuco of dumping frozen concentrated orange juice on international markets and magnifying the price fall. The government finally intervened in July 1974 (described in detail in the following section). But its imposition of a minimum export price for frozen concentrate and a minimum price for oranges -- as well as the suspension of Citrosuco's export licenses until December 1974 -- did not help the sector. The decreased demand for oranges resulting from the suspension of Citrosuco's licenses and the bankruptcy of Sanderson further depressed orange prices, despite the government's attempts to regulate the industry.

The contemporary industrial structure of the citrus processing sector emerged from the crisis of 1974. In 1975, the state government of Sao Paulo expropriated the industrial assets of bankrupt Sanderson and reorganized the company, which returned to production in the 1975/76 season as Frutesp. In 1977, Coopercitrus, a cooperative of orange growers, acquired control of Frutesp. Several smaller companies hurt by the crisis were acquired by Citrosuco and Cutrale, thereby increasing the concentration of the industry.

And finally, Cargill's acquisition of Citrosbrasil in 1976 marked the arrival of a major new player in the industry.

In 1977, a freeze in Florida initiated a period of much higher world prices for frozen concentrated orange juice (table 6.3). By 1978, average wholesale prices for frozen concentrate in the U.S. market had increased by roughly 71 percent over 1976 levels (Irias 1981, 20). Brazilian companies responded rapidly, expanding their production and increasing their exports to the U.S. market. The U.S. share of Brazil's exports of frozen concentrated orange juice increased from an average of 14 percent during 1970-76 to 22 percent in 1977 and 44 percent in 1978. By 1978, the United States was the largest importer of Brazilian concentrate.⁴

The climate shocks suffered by the Florida orange crops in the 1980s were the primary factor that shaped this third stage of development of the Brazilian citrus industry. The United States became a net importer of frozen concentrated orange juice, and Brazil became the dominant world producer, largely because of its increasing share in the U.S. market (table 6.4). At the beginning of the decade, Brazilian processors had produced the equivalent of 91 percent of Florida's frozen concentrate output; by the second half of the 1980s, Florida's production represented less than 60 percent of Brazil's output.

The Brazilian frozen concentrated orange juice industry also increased its share in the country's total exports, from 0.5 percent in 1970 to 4.7 percent in the 1980s. The industry's share in the economy as a whole is much smaller, however. Even after two decades of rapid growth, industry revenues are equivalent to only 0.56 percent of Brazil's GDP, a reflection of the strong outward-orientation of the sector. The industry has a much greater relevance to the economy of the state of Sao Paulo, however, since most (96 percent) of Brazil's processing capacity is located there, and citrus-related activities employ an estimated 150,000 workers in the state.

Brazilian economic policies and the citrus industry

Government policies have also affected the citrus industry, although they have not been directly responsible for its phenomenal growth. Both broad economic policies, such as export and agricultural subsidies and exchange rate management, and sectoral interventions had an effect on the economic performance of the industry. But the picture that emerges from an analysis of these policies is at best mixed. Although the industry profited from export subsidies and domestic incentives in the 1970s, the overall impact of government policies has not always been favorable to the sector, particularly in the 1980s. It is quite clear, however, that sector-oriented policies were not designed to foster competition among frozen concentrate producers in Brazil, and in fact they tended to reinforce the oligopolistic structure of the industry.

Trade policies and the macroeconomic environment

Over the last three decades, Brazil's economic policies have often fostered import substitution-based industrialization and appreciation of the real exchange rate, which created an economic bias against exports.³ Macroeconomic imbalances have been the norm rather than the exception, as the upward trend in the inflation rate since the early 1970s and in the current account deficit up to the early 1980s suggests (table 6.5).

The major exception to these policies occurred during 1964-73, when the government followed a consistent set of macroeconomic policies that controlled inflation and a trade liberalization program that diminished the antiexport bias of the economy. With the first oil shock, however, the government introduced an ambitious import substitution program directed at basic industrial inputs and capital goods. This program raised the cost of domestic inputs and reduced the competitiveness of Brazilian exports. The situation was aggravated by an exchange rate policy, based on a naive purchasing power parity criterion, that did not take into account adverse price shocks. To

reduce the antiexport bias of these policies, the government relied mainly on export subsidies.

Under external pressure in the early 1980s, Brazil began to substitute real exchange rate adjustments for export subsidies. The overall trade policy, however, remained highly protectionist as imports were curtailed through a growing array of nontariff barriers. Eventually, the folly of this strategy was recognized, and by 1988 a trade liberalization movement began to gather support. In 1990, the Collor administration announced a major liberalization effort, beginning with the abolition of most nontariff barriers. Ironically, however, macroeconomic disturbances and government intervention have induced a significant appreciation of the domestic currency over the last few years (table 6.5), counteracting the positive impact of the trade liberalization for exporters.

The antiexport bias resulting from the import substitution strategies of the Brazilian government has not been a major obstacle to expansion of the frozen concentrate industry, however. Historically, oranges have represented roughly 65 percent of the processing costs of the Brazilian frozen concentrate industry (Martinelli 1989, 310). For a typical Brazilian orange grove, tradables such as fertilizers and pesticides account for as much as 50 percent of production costs (Amaro, Yamagishi, and Barros 1983, 11). Yet despite government policies that raised the domestic prices of tradables above their international level, the burden of these higher domestic costs has fluctuated. Price controls were often applied to agricultural inputs, and subsidized credit programs during the 1970s substantially reduced the real cost of some critical inputs for the sector (Irias 1981). And given Brazil's chronic high inflation, relative prices sometimes even changed in favor of orange producers.

There is no doubt, however, that the citrus sector has been heavily taxed by the overvaluation of the domestic currency, although the overall impact of this distortion has depended on the effects of other government policies as well. During the 1970s, the frozen concentrated orange juice

industry and other export industries had access to a wide array of incentives. These benefits included tax credits, exemptions from state and federal value added taxes and from corporate income taxes on export-related profits, and subsidized lines of credit for investment and for operational financing of export activities. Martone and Primo Braga (1988) have shown that, for export activities in general, these incentives outweighed the disincentive effects of the overvalued cruzeiro in the 1970s. The citrus sector also benefited from various agricultural support programs, including subsidized credit for fertilizer purchases and, until 1976, fiscal incentives for reforestation projects.⁶

All in all, the net impact of the macroeconomic environment and of trade and exchange rate policies was favorable to the citrus sector in the 1970s. But as the distortions in the Brazilian economy worsened and external pressures mounted, the government began to phase out its myriad fiscal incentives in the 1980s.⁷ The citrus sector lost access to these incentives just as the macroeconomic environment grew more unstable. In the second half of the 1980s, the currency became increasingly overvalued and, in the context of failed stabilization attempts, high real interest rates at times substantially increased financial costs during this period.

Sectoral policies

Over the last two decades, the government has introduced several sector-specific policies that have affected the citrus industry.⁸ In 1974, export licenses -- issued by the Brazilian Foreign Trade Bureau -- were introduced as a way of imposing a new minimum export price scheme. The minimum export price scheme was expected to increase the country's foreign exchange revenues and to prevent capital flight by placing a floor on the amount of foreign currency that Brazilian exporters had to repatriate (table 6.3). The government also took several other steps during this period in response to the first major economic crisis faced by the frozen concentrate industry (described above). The expropriation of the assets of the bankrupt Sanderson by the state

government of Sao Paulo in 1975 paved the way for the appearance of a major frozen concentrate producer (Frutesp) controlled by orange growers. Also in 1975, the Foreign Trade Bureau created a frozen concentrated orange juice export committee, with the power to define the minimum export price and export quotas at the firm level and to oversee fruit price negotiations between growers and processors.

Despite increasing government intervention, relations between citrus growers and processors remained tense. In 1976, orange producers accused Citrosuco and Cutrale of cartel-like behavior.⁹ But by 1977, the Brazilian frozen concentrate industry entered a new phase of expansion following a severe freeze in Florida citrus groves. Price regulations became nonbinding as a sellers' market developed and international prices for frozen concentrated orange juice doubled between 1976 and 1978 (table 6.3).

Another chapter in the regulatory history of the industry was opened in 1979, as the government introduced major changes in its trade and exchange rate policies. To accompany the gradual dismantling of existing export subsidies, the government agreed to a 30 percent maxidevaluation of the cruzeiro in December 1979 -- the first major departure from the minidevaluation or crawling-peg policy followed since 1968. But the government was unwilling to allow exporters to appropriate the difference between the 30 percent increase in cruzeiro revenues brought by the devaluation and the loss of tax credits (rebates of federal value added taxes) equivalent to 15 percent of the export value. The government introduced a 30 percent export tax on the prevailing minimum export price of frozen concentrated orange juice. The rationale was that this tax would eliminate above-normal profits and help prevent terms of trade losses.

The industry reacted strongly to these measures, which would have reduced the cruzeiro earnings per metric ton of frozen concentrate exported by 0.6 percent (Duran and associates 1981, 32). The government retreated in January 1980 by lowering the export tax rate to 8 percent. But in May, it raised the minimum export price from \$350 a metric ton of frozen concentrate

(65 degrees Brix) to \$900, thereby increasing the tax burden from \$28 a ton to \$72.¹⁰

In Jun. 1980, the rules of the game were changed again, as the government substituted a system of compulsory contributions for the export tax. The contributions followed a decreasing schedule: starting at \$210 a ton on June 1, 1980 they fell by \$15 every two weeks, reaching zero by the end of December. The contribution was then to be returned to exporters according to a symmetrical schedule. The governmental objective -- besides a short-run increase in revenue and access to zero-cost financing -- was to induce exporters to postpone sales to counteract the declining trend in international prices.

In May 1980, the government suspended export licenses for the frozen concentrate industry in order to force orange producers and processors to reach an agreement on conditions for the sale of the 1980/81 orange crop. The agreement reached in June 1980 established minimum prices for the fruit and conditions of payment, and for the first time included a clause linking the final price per box of oranges to market conditions for frozen concentrate. The government wanted the industry to build up stabilizing inventories of up to 200,000 metric tons of frozen concentrate -- about 50 percent of the industry's processing capacity at the time -- by the end of the 1980/81 season. Credit subsidies to sustain this buildup of inventories were offered as an incentive. If market conditions improved and the industry missed the carryover target, orange producers would receive an additional \$0.015 per box delivered for each 10,000 metric tons of frozen concentrate below the established target.¹¹

By November 1980, however, it became clear that this strategy would not prevent the international price of frozen concentrated orange juice from falling. Florida had a good orange crop in 1979/80, and the international market was already signaling a price 30 to 40 percent below the prevailing Brazilian minimum export price (table 6.3). The government abolished the minimum export price system, which meant that orange growers and processors

had to negotiate a new agreement since the minimum price per box was linked to the minimum export price. Under government prodding, growers agreed to drop the clause linking the final price to inventory levels in exchange for maintaining the minimum price per box initially agreed.

Once more, however, an external shock favorably altered market conditions for the Brazilian frozen concentrate industry. In January 1981, a freeze reduced the Florida orange crop by an estimated 34.3 million boxes. The price of frozen concentrate bounced back promptly, breaking the \$1,000 a ton barrier. Subsequent freezes in Florida in 1982 and 1983 maintained sellers' market conditions until 1985.

And once more, the government modified its sectoral policies in response to these new circumstances. It reintroduced the minimum export price and adopted a system of export quotas in 1982. The quotas, which were allocated to frozen concentrate producers on the basis of past export performance, imposed a new barrier to entry and strengthened the dominant position of the two largest firms (Cutrale and Citrosuco). The export tax also reappeared.

By 1985, however, the rapid expansion of Brazilian production (table 6.1) and optimistic forecasts of the recovery of Florida orangeries began to drive international prices down (by 43 percent in nominal terms between January 1985 and February 1986). The Brazilian Foreign Trade Bureau reduced the minimum export price several times, but it could not do so fast enough to keep pace with changes in international prices. As in 1980, processors had to register their sales at the minimum export price value in order to get export licenses while effectively selling the product at a lower price. Processors used their external assets to reduce their sales price, returning the difference between the minimum export price and the market price to buyers -- a practice known as *cambio-portugues*. Finally, in March 1986, both the minimum export price and export quotas were abolished, leaving export licensing as the sole instrument of government control.

In a parallel development, government attempts to mediate price negotiations between growers and processors failed in 1985. Efforts to fix a

minimum price per box of orange while prices for frozen concentrate were collapsing met strong resistance from processors. The government finally bowed out as an arbiter in these negotiations, and in 1987 both sides accepted a market-oriented solution. Under a new type of pricing contract, called a participation contract, both sides agreed to base the price for a box of oranges on the seasonal average dollar price of frozen concentrate in the New York futures market instead of establishing a minimum price in domestic currency. By accepting a formula for sharing the risks of price fluctuations, growers and processors hoped to minimize frictions in their negotiations.

Market structure, industrial organization, and competitiveness

The domestic market

Unlike most of Brazilian industry, the frozen concentrated orange juice industry did not rely on a protected home market to expand its capacity. Since its early stages in the 1960s, the industry has been outward-oriented, with domestic sales representing only 3 to 5 percent of total shipments. This market orientation contrasts markedly with the inward-orientation of most of Brazil's industries. Even after two decades of export expansion, exports of other industries represented no more than 22.6 percent of total industrial shipments in 1989, compared with 95 percent for the frozen concentrate industry.

Domestic sales of frozen concentrated orange juice have been small for several reasons. First, per capita income is relatively low (about \$2,000 a year in 1989), and frozen concentrate remains a luxury good for most Brazilians. Second, the domestic supply of fresh fruit is scattered across the country, enabling local fruit growers to compete successfully with the relatively high-priced frozen concentrate. Because of this small domestic demand, monopolistic pricing in the home market has not helped to pave the way for export expansion, as it has in some other industries. The Brazilian frozen

concentrate industry has, however, achieved a significant degree of market power in the international scene.

The international market

The state of Sao Paulo in Brazil and the state of Florida in the United States, the two major frozen concentrated orange juice producing areas in the world, account for about 84 percent of world production. There are also two major importing areas, the United States and the European Community (EC), which account for 91 percent of world imports. Australia, Mexico, Spain, Japan, Israel, Argentina, Italy, Cyprus, South Africa, Cuba, and Belize also produce frozen concentrated orange juice, while on the demand side, Canada and Japan are also important importers.

By the early 1970s, Brazil had established itself as the leading exporter of frozen concentrated orange juice (table 6.6), but it was still a small producer compared with the United States: Sao Paulo's production represented only 13 percent of Florida's production. Florida producers maintained price leadership in the world market and were the primary suppliers for the U.S. market. Brazilian frozen concentrate was exported mainly to Western Europe, which was the fastest growing market for frozen concentrated orange juice (Ferreira and Larson 1973) and was much less protected than the U.S. market. By 1970, 72 percent of Brazilian exports of frozen concentrated orange juice were going to the EC and only 3 percent to the United States.

Brazilian exports to the U.S. market before the late 1970s were determined to a large extent by technical considerations. Brazilian concentrate was used to improve the color of early-season Florida juice (Ward and Kilmer 1980, 30).¹² As long as the price differential between Florida and Brazilian concentrates remained smaller than the price wedge created by U.S. trade barriers, imports from Brazil were used mainly for reexport. Drawback regulations allowed U.S. producers to receive rebates of duty payments on imports of frozen concentrate that were reexported. By using the drawback scheme, U.S. producers were able to lower the average price of U.S. exports

and so to compete in third markets -- basically, Europe -- against lower cost producers.

From 1965 to 1976, the United States remained a net exporter of frozen concentrated orange juice, with drawback operations accounting for approximately 60 percent of exports (Moretti and associates 1985, 45). The 1977 freeze in Florida was the turning point in the modern history of the industry. Since then, the United States has been a net importer of frozen concentrated orange juice. And since 1978, the price differential between the Florida and Brazilian concentrates has been larger than the tariff wedge (Ward and Kilmer 1989, 135-37), and the Brazilian product began to displace U.S. production and, indirectly, Florida-grown oranges.

The importance of the U.S. market for Brazilian frozen concentrate producers increased dramatically with the consecutive climate shocks suffered by Florida citrus groves in January 1981, January 1982, and December 1983 (tables 6.1 and 6.4). Orange production in Florida, which had peaked at 212.7 million boxes during the 1979/80 season, fell to 107.2 million boxes by 1984/85, and the production of frozen concentrate from Florida oranges fell from 670,000 tons to 340,000 tons (FAO 1989b, 41). And although citrus production in Florida has since recovered, estimates suggest that even under optimistic assumptions, Florida will not surpass its previous output record until the mid-1990s (Behr, Brown, and McClain 1989).

Brazilian dominance in the international market is clear. By the mid-1980s, Brazil accounted for about 80 percent of world exports of frozen concentrated orange juice (FAO 1989b, 15). Brazilian frozen concentrate producers supplied more than 94 percent of U.S. imports during the 1980s and accounted for 50 percent of sales in the U.S. market. In the EC, Brazil also remains the primary supplier, accounting for more than 65 percent of imports from outside the EC.

Industrial organization

The contemporary structure of the Brazilian frozen concentrated orange juice industry began to take shape in the mid-1970s during the industry's first major economic crisis, as several small firms dropped out or were absorbed by larger producers. After the mergers, the structure of the industry became increasingly more concentrated. By 1985, Cutrale and Citrosuco controlled about 65 percent of installed processing capacity, up from 52 percent in 1975 (Martinelli 1989), and jointly operated three small companies (Sucorrigo, Tropisuco, and Citral). Four firms accounted for 92 percent of Brazil's exports of frozen concentrate and 90 percent of installed processing capacity (table 6.7). The state of Sao Paulo was home to twenty-one of Brazil's twenty-eight processing plants, and Sao Paulo producers controlled 96 percent of the industry's processing capacity.¹³

Several important entry barriers help explain how the industrial structure was able to remain so concentrated over the last decade despite the rising profitability of the industry. The existence of economies of scale is one factor. Citrosuco, for instance, controls the largest concentrate processing plant in the world (in Matao, Sao Paulo), with a processing capacity of 69 million boxes of oranges a year. The capital intensity of the industry has also been increasing, as large-scale producers move into bulk transport. Bulk transport represents a \$80-\$100 reduction in shipping costs per ton of frozen concentrate over conventional shipping in 200 kilogram drums, but it requires heavy investments in tank farms, specialized shipping terminals, and transportation systems. Orange supplies present yet another obstacle to new firms. Some of the larger companies have introduced vertical integration to guarantee their orange supplies. Accordingly, they have acquired a stronger bargaining position with independent orange suppliers than new entrants would have.

The difficulty of access to established distribution networks in importing countries is another major obstacle for new entrants. Strong ties link Brazilian exporters and foreign buyers. In the United States, Coca-Cola

buys exclusively from Cutrale, Procter & Gamble from Cargill, and Tropicana, Pasco, and Beatrice from Citrosuco; in Japan, Mitsui buys exclusively from Citrosuco. An estimated 80 percent of Brazilian shipments of frozen concentrated orange juice to the United States go to those preferred importers, leaving only 20 percent of the market for open competition among exporters. This exporter-importer relationship, which usually involves significant price rebates, establishes a dependable source of frozen orange juice concentrate for beverage processors and a stable outlet for the Brazilian producer. In Europe, preferential long-run contracts between Brazilian exporters and local processors cover a much smaller share of transactions.

Finally, government policies up to the mid-1980s also supported concentration in the sector. Export quotas based on past export performance is probably the clearest example. The concentrated structure of the industry, the barriers to entry, and Brazil's dominance in the international market all made oligopolistic pricing possible. And price coordination has been often fostered by the Brazilian government, through such measures as the minimum export price system.

International competitiveness

For the most part, the history of the Brazilian frozen concentrated orange juice industry has been a tale of classic comparative advantage. Favorable climate and elastic land and labor supplies for orange production allowed for rapid, low-cost expansion of the industry. Orange production grew at an average annual rate of 12.5 percent during 1970-87 (without any significant increase in yield per tree), while industrial processing capacity grew at an annual rate of 19.2 percent (tables 6.2 and 6.8).

The price of oranges -- a measure of comparative advantage in the frozen concentrated orange juice industry since oranges represent about 60 percent of production costs -- is much lower in Sao Paulo than in Florida. Except during the 1985/86 season, the on-tree price in Florida has been at least twice the

price in Brazil (table 6.9). Brazil's cost advantage essentially reflects its lower land and labor costs. Brazil's international competitiveness in the frozen concentrated orange juice industry is also illustrated by its high index of revealed comparative advantage of 20.27 in 1985, which is by far the highest among the major industrial exporting sectors in Brazil (food, beverages, and tobacco is next at 3.1).¹⁴

Unfair trade cases

Protectionism and the U.S. citrus industry

The dynamism of Brazilian exports and the rapid expansion of international flows of frozen concentrated orange juice over the last two decades were not entirely unimpeded by restrictions on trade in citrus juices. Although trade barriers tend to be low or even absent in nonproducing countries, they are quite high in most producing countries (table 6.10).

Import duties have been the main instrument of trade protection in developed market economies. Ad valorem tariffs above 20 percent are not unusual, in sharp contrast with low average tariff rates in these countries. Some countries apply specific duties, with implied tariff rates as high as 40 percent, depending on market conditions. In Japan, high tariffs were augmented by an import quota system for oranges and concentrate that is now being phased out under a bilateral agreement with the United States (FAO, 1989b).

The history of protection for the citrus juice industry in the United States is probably the clearest example of the industry's ability to secure protection against foreign suppliers. The Smoot-Hawley Tariff Act of 1930 introduced a duty of 70 cents a gallon on the regular-strength equivalent of frozen concentrated orange juice.¹⁵ In 1948, the most-favored-nation rate was reduced to 35 cents a gallon (equivalent to \$487 per ton of concentrate at 65 degrees Brix), where it remains.¹⁶ Drawback regulations allow refunds of 99 percent of the duty if an equivalent quantity of frozen concentrate is

exported within three years. The importance of drawbacks declined after 1977, however, as the U.S. industry became more and more inward-oriented.

In addition to the import duty, all frozen concentrated orange juice imports arriving in the United States through a Florida port must pay the Florida citrus import equalization excise tax of \$41.50 a metric ton. The tax was introduced under pressure from the Florida Citrus Commission as a way of making imports share in advertising and promotion costs paid by Florida producers. The importance of this tax has been declining, however, because a growing proportion of imports are arriving through ports outside Florida. In the late 1970s, 83 percent of imports arrived through Florida ports, but by 1986 this share had dropped to 46 percent, largely because of the growth of tank farms (which process bulk juices) outside of Florida (Ward and Kilmer 1989, 134). Such processing and packaging operations have become economically feasible because of the growing shift in U.S. consumer demand from frozen concentrate to chilled, reconstituted orange juice. And, as Berman (1986, 50) points out, this structural shift is bound to continue as long as Brazilian producers have a strong interest in finding ways to bypass the equalization tax.

In the early 1980s, Florida growers, beset by increasing import competition and a consecutive series of climate shocks, began to look for alternative forms of protection. That they turned to unfair trade laws is not surprising since the United States, as well as other developed countries, has been relying increasingly on these laws as a substitute for safeguard actions. And considering Brazil's interventionist trade policies, the prevailing belief in the United States was that any Brazilian industry was "guilty" of unfair trade practices until proven innocent.¹⁷ That meant that the task of building political support for relief against Brazilian exports did not require a major public-relations effort from import-competing industries in the United States.

The U.S. countervailing duty investigation

On July 14, 1982, Florida Citrus Mutual, an association of orange growers, filed a petition claiming that the Brazilian government was subsidizing frozen concentrated orange juice exports.¹⁸ The U.S. Commerce Department accepted the petition and initiated an investigation under U.S. countervailing duty laws. On September 9, the U.S. International Trade Commission (ITC) issued an affirmative preliminary determination of injury to domestic producers, and on December 13, the Commerce Department issued a preliminary determination that the Brazilian government was subsidizing local producers.¹⁹

Two Brazilian programs were explicitly identified as providing subsidy-like benefits: Resolution 674, which provided preferential financing of working capital for exporters, and the income tax exemption for export earnings. Based on data provided by the three leading Brazilian frozen concentrate exporters (Cutrale, Citrosuco, and Cargill), the Commerce Department estimated that preferential financing under Resolution 674 was equivalent to a subsidy of 1.64 percent²⁰ and the income tax exemption to a subsidy of 1.13 percent of the value of the Brazilian exports. On December 17, 1982, the Commerce Department ordered a suspension of liquidation of all Brazilian exports of frozen concentrate to the United States, and an import deposit of 2.655 percent of the fob value of Brazilian frozen concentrated orange juice sales was imposed.

The Brazilian government responded in January 1983 by requesting that the investigation be suspended and offering to impose an export tax equal to the estimated subsidy.²¹ While the agreement was being negotiated, the subsidy linked to Resolution 674 was reassessed at 2.38 percent, because of new developments in the Brazilian financial market. Finally, a suspension agreement was signed on February 24, 1983, and on April 30, 1983, Brazil imposed an export tax of 3.51 percent on its frozen concentrated orange juice exports to the United States.

Despite the suspension agreement, the Brazilian government requested that the subsidy investigation be concluded. On June 6, 1983, the Commerce Department issued a positive final determination, and on July 14, the ITC issued its final injury determination, ruling that the local industry was threatened with material injury because of Brazilian subsidies.²² The ITC ruling argued that the recovery of the U.S. frozen concentrated orange juice industry to prefreeze production and profitability levels, given flat consumption trends, would be hindered by future subsidized imports. The suspension agreement, based on the offsetting Brazilian export tax, was maintained.

On May 31, 1984, Cutrale, Citrosuco, and Cargill filed a request for a review of the injury ruling, arguing that the December 1983 freeze in Florida and the lower-than-expected Brazilian crop of 1983/84 had changed the circumstances under which the industry operated. Florida Citrus Mutual opposed the request, but the ITC agreed to initiate an investigation. On December 11, 1984, the ITC ruled that revocation of the suspension agreement would threaten the domestic industry with material injury.

This first experience of Brazilian frozen concentrate producers with accusations of unfair trade practices was significantly influenced by events beyond the control of the Brazilian industry. The increased demand for protection from Florida producers arose mainly from the cost-push price impact of unusual back-to-back climate shocks. The second round of unfair trade actions against the Brazilian frozen concentrate industry, however, was more directly related to reactions of Brazilian firms to market developments.

*Antidumping cases*²³

By the mid-1980s, the Brazilian frozen concentrated orange juice industry found itself in a trap. The unusual sequence of severe freezes in Florida and the high world prices that prevailed throughout the first half of the decade had fostered a dramatic expansion of Brazil's orange production and processing capacity. The Brazilian harvest of 1985/86 produced a record 239

million boxes of oranges. At the same time, the Florida orange industry was showing the first signs of recovery, with a 14 percent increase in output over the previous record-low season.

Brazilian processors were also facing an unusual situation. The expansion in processing capacity had increased the competition for future orange supplies. By late 1984, while the international demand for Brazilian concentrate was still strong, Brazilian processors tried to guarantee their future orange supplies by offering significant advance payments for the 1985/86 crop. This competition bid prices up to a record level (table 6.9).

Meanwhile, frozen concentrated orange juice prices in the U.S. market, which had been fairly stable after a steep increase in the first part of 1984, began to show a clear downward trend after May 1985. This trend reflected the excess supply conditions that had developed in the international market. But it caught Brazilian producers in a vulnerable position, locked into high-price contracts for their main input while facing declining world prices for their product.

The financial squeeze suffered by Brazilian producers during the 1985/86 season was severe.²⁴ While the average minimum export price for the season was about \$1,100 a metric ton (at 65 degrees Brix), direct production costs averaged \$1,327.50 a ton: fruit costs (\$935 for 250 boxes) plus pick and haul costs (\$112.50) plus processing, warehousing, and transport costs to the port of Santos (\$280.00). Other costs to producers included the state value added tax of 8.5 percent (on the fob export value), the export tax of 1 percent, and the offsetting export tax of 3.51 percent on all shipments to the United States.

The picture becomes even bleaker when one considers that the minimum export price was really just an accounting artifact and not a relevant price benchmark for frozen concentrate exporters. As international prices collapsed, the minimum export price often lagged behind, forcing Brazilian producers to practice the *cambio-portugues* described earlier. The effective price received by Brazilian exporters in 1985/86 was only about \$850 to \$900 a ton (USDA

1986), or approximately 20 percent below the average official minimum export price for the period.

Reflecting these market developments, Brazilian frozen concentrate exports fell by almost 12 percent between the 1984/85 and 1985/86 seasons. At the same time, production reached record levels in 1985/86 (875,000 tons at 65 degrees Brix). With exports down and the domestic market continuing to be only a marginal source of demand (less than 5 percent of total demand), the industry ended the season with very high stocks of frozen concentrate (about 230,000 metric tons), further contributing to its financial woes.²⁵

This imbalance between production costs and sales prices was the result mainly of an exceptional lack of coordination among Brazilian firms as they fought to secure stable input supplies. Yet, it was promptly seized on by foreign producers as a situation that could be exploited under the unfair trade banner. In 1986, the Brazilian frozen concentrated orange juice industry was accused of dumping by both the United States and Australia.

The U.S. antidumping case. On May 9, 1986, Florida Citrus Mutual filed a petition arguing that frozen concentrated orange juice from Brazil was being sold in the United States at "less than fair value," and the Commerce Department agreed to initiate an antidumping duty investigation. On June 23, the ITC issued a preliminary determination that the U.S. frozen concentrated orange juice industry was "materially injured or threatened with material injury" by imports of frozen concentrate from Brazil at less than fair value (USITC 1986, 1).

On October 16, 1986, the Commerce Department issued a preliminary determination that Brazilian sales of frozen concentrate in the United States were being made at less than fair value and estimated the dumping margin at 8.45 percent. In its final determination on March 17, 1987, the Commerce Department maintained the suspension of liquidation of all exports of frozen concentrated orange juice from Brazil, except those from Cutrale, imposing an import deposit of 1.96 percent of the selling price.²⁶ The estimated margin for Cutrale's sales was negligible (0.48 percent), and its exports to the

United States (35 to 40 percent of total Brazilian exports to the United States) were excluded from the suspension of liquidation order. In April 1987, the ITC made a positive final determination of injury.

This antidumping case raised many complex legal issues. Several U.S. companies -- including the National Juice Products Association, Procter & Gamble, Tropicana, and Coca-Cola -- opposed the investigation. They argued, along with the Brazilian respondents, that Florida Citrus Mutual was not an interested party since its members (basically, orange growers) did not produce the like-product (frozen concentrated orange juice). They also argued that Florida Citrus Mutual had not established from the beginning that a majority of the industry supported the investigation and, furthermore, that it could not have done so because a majority of the U.S. industry opposed the investigation.

Despite this opposition, the Commerce Department found that there were sufficient grounds to initiate the investigation. On the issue of whether the petitioner was an interested party, the Department pointed out that although Florida Citrus Mutual had been the only petitioner in the earlier countervailing duty investigation, the issue of standing had not been raised at that opportunity. Besides, after the investigation had been initiated, the petition was amended to add six frozen concentrated orange juice processors as copetitioners.

The question of majority support was dealt with in two stages. First, the Commerce Department argued that initiation of unfair trade procedures does not require majority support in the domestic industry. Commerce's interpretation was tantamount to saying that a petitioner is presumed to be filing on behalf of the domestic industry unless it can be shown that a majority of the domestic industry opposes the petition. Second, although recognizing that the parties opposing the investigation represented a significant proportion of the U.S. industry (they accounted for 52.9 percent of U.S. frozen concentrated orange juice production), the Commerce Department argued that the proper definition of the industry should exclude processors

whose Brazilian imports accounted for more than 50 percent of production. Once this "exclusion provision" was applied, the remaining firms opposing the investigation accounted for only 38.64 percent of U.S. production and, accordingly, did not represent a majority of the industry.

In 1988, the question of majority support was brought up again by Citrusuco in a petition to the U.S. Court of International Trade.²⁷ The argument was again rebuffed, with the court stating that the Commerce Department had the discretion to reject a petition for lack of industry support but was not "required to dismiss petitions that are not proven to be affirmatively supported by the domestic industry."²⁸

Finger and Murray (1990) have pointed out that unfair trade procedures in the United States, once initiated, have a high probability of culminating in an affirmative determination. The broad interpretation of injury is a major factor behind this bias in favor of the petitioner. In the case of the frozen concentrated orange juice investigation, the final dumping margin was quite small and the penetration ratio for Brazilian frozen concentrate in the U.S. market had changed little in 1985/86 from the previous season.²⁹ Yet, the ITC reached a positive injury determination by a vote of 3 to 2. In short, the history of this antidumping investigation highlights the flexibility of U.S. legislation in accommodating the protectionist interests of domestic producers under competitive pressure from foreign imports.

The Australian antidumping case. On July 25, 1986, the Australian Citrus Processors Association submitted a complaint on behalf of eight processors to the Australian Customs Service, claiming that Brazilian frozen concentrated orange juice was being exported to Australia at prices below "normal value" -- that is, at prices that did not recover the full cost to produce and sell the frozen concentrate. The gist of the complaint was that international prices had fallen from \$1,800 to \$800 per metric ton (65 degrees Brix) between February 1985 and March 1986, while the normal value for Brazilian concentrate was about \$1,401 a ton (fob Santos). The normal-value estimate was based on cost of production data published in a U.S. periodical (*Citrograph*, June

1986), using a methodology similar to that presented in the cost estimate described above.

The Australian market accounted for only 0.5 percent of Brazilian export revenues in 1985 and 1986 (table 6.3),³⁰ and the share of Brazilian imports in orange juice consumption in Australia had been declining since 1983 (from 42 percent in 1983/84 to 27 percent in 1986/87). So although Brazil was the source of 90 percent of Australian imports throughout this period, the Australian market was of only marginal importance to Brazilian producers. This fact helps to explain why Brazilian producers failed to cooperate in the antidumping investigation. Of the five Brazilian companies asked to supply information, only Frutropic, with 3.2 percent of the Brazilian industry's processing capacity, bothered to answer. Accordingly, the Customs Service considered the information provided by the petitioners as the best information available for the investigation.

In November 1986, the Australian Customs Service made a preliminary determination of dumping and established a noninjurious free on board (NIFOB) value of \$1,050 per metric ton for Brazilian concentrate (FAO, 1989b).³¹ In the final determination of June 1987, Customs reaffirmed its finding of dumping and ruled that a causal link existed between this practice and some of the claims of material injury made by the Australian industry. Customs did not consider that imposition of a duty equivalent to the full dumping margin was warranted, deciding instead on an amount equal to the difference between the fob export price and the NIFOB value. The NIFOB value was established at \$1,401 a ton for imports before December 31, 1986, and \$1,200 for those entering after January 1, 1987.

Effects of unfair trade actions

Effects on policy. There is no doubt that the policy environment in which the Brazilian frozen concentrated orange juice industry operates has gone through some major changes since the first unfair trade accusations in the early 1980s. The minimum export price scheme, export quotas, and

government intervention in the negotiations between processors and orange growers have all disappeared, suggesting a move toward liberalization. But the tax burden on the sector has grown heavier, with the introduction of the state value added tax and the end of the income tax exemption for export-related profits.

But the link between these changes and the unfair trade cases is tenuous at best. The demise of export subsidies was part of a broader reform in response to both external pressures and domestic interests, including the search for new sources of revenue by state governments. Macroeconomic developments provided the impetus for most of the recent changes in industry-specific policies. The only major exception was the offsetting export tax introduced under the U.S.-Brazil suspension agreement in the countervailing duty case. It is ironic that while the offending subsidies have since been discontinued (or significantly reduced), the export tax has remained.³²

Effects on the industry. Brazilian producers have avoided international price discrimination since 1986 to prevent third-market sales prices from being used as a basis for new antidumping cases. So despite the strong devaluation of the U.S. dollar vis-a-vis European currencies since 1985, there has basically been only one "world price" for Brazilian frozen concentrated orange juice.³³

Interviews conducted with Brazilian producers suggest that Brazilian pricing behavior in export markets during the 1980s has been consistent with a dominant-firm price-leadership strategy. Since Florida is the only other significant world supplier of frozen concentrated orange juice, Brazilian producers have been able to use U.S. supply forecasts as a basis for establishing prices that will maximize their short-run profits for a given level of residual world demand. Errors are absorbed through stock movements. In short, during periods of tight world supply, Brazilian exporters seem content to consider their foreign sales as complementary to the domestic production of importing countries.

Price coordination among Brazilian firms has also been facilitated by some institutional developments fostered by the 1985/86 crisis. The most important change was the adoption of participation contracts by orange growers and processors for sharing the risks of international price fluctuations. These contracts diminish the danger of a cost-revenue mismatch such as those that occurred in 1974/75 and 1985/86. They also lessen the vulnerability of the industry to accusations of selling at below-cost prices. Another change was the Brazilian government's adoption in January 1987 of a reference-price system to guide the repatriation of foreign exchange earnings. The reference export price -- which is also used in preparing participation contracts -- is established by subtracting the costs of transport, the U.S. tariff, the less-than-fair-value margin, U.S. warehousing, port and brokerage fees, the Florida equalization tax, and other costs from the price of frozen concentrate in the New York futures market.³⁴

Since the 1985/86 season, there has been no excess supply in the international market for frozen concentrated orange juice. Dry weather, disease, and poor care of citrus groves reduced Brazilian orange production to an average of 10 percent below its record output of 1985/86 (table 6.8). A significant increase in domestic demand for freshly squeezed orange juice during the artificial economic boom created by the Cruzado Plan (1986) and lower concentrate ratios for the Brazilian orange also helped to reduce the output of the Brazilian frozen concentrate industry (table 6.1). At the same time, the recovery of Florida groves was slower than expected, while consumer demand remained strong in both the United States and Europe. Under these tight supply conditions -- a reversal of the scenario that motivated the antidumping investigations -- one might even argue that there are no major opposing interests between domestic producers in importing countries and Brazilian exporters.

Most models, however, forecast that growth in the supply of frozen concentrated orange juice will outpace growth in demand, creating a buyers' market by the early 1990s (FAO, 1989b). Already by late 1990, expectations of

bumper orange crops in Florida and Sao Paulo caused a rapid drop in the international price of frozen concentrate. Thus, market conditions that tend to elicit charges of dumping are likely to emerge again in the 1990s. Furthermore, since Brazilian producers have higher fixed costs (reflecting their larger scale and larger stock accumulation practices), they remain vulnerable to accusations of pricing below average cost during periods of falling prices.³⁵ Whether the Brazilian industry will be able to escape these accusations, given the new marketing and institutional arrangements introduced in the mid-1980s, is an open question. Still, there is no doubt that Brazilian companies are now more difficult targets for unfair trade actions than during past episodes of excess supply.

The measures imposed as a result of unfair trade cases have had only a marginal impact on the industry and have been completely dominated by other distortions affecting the industry. The direct burden imposed on producers by the offsetting export tax on sales to the U.S. market was less than half that of Sao Paulo's value-added tax. And the U.S. antidumping duty of 1.96 percent is dwarfed by the specific import duty of \$487 per metric ton, which was equivalent to a 22 percent ad valorem tariff on the average U.S. selling price for the 1987-89 period. The Australian antidumping duty, in turn, has become completely irrelevant during 1988 and 1989 as the Brazilian fob price has risen above the estimated noninjurious free on board value.

That is not to say that the unfair trade actions had no impact on the performance of Brazilian firms. Most important, as described above, was the apparent education effect of the antidumping cases, which helped bring about institutional changes and new marketing arrangements that intensified oligopolistic coordination among frozen concentrate producers. Second, the "noise" created by the Australian antidumping investigation was sufficient to shut down that market for Brazilian firms during 1987 (table 6.4). Last but not least, Brazilian firms were unanimous in pointing out the high harassment effect associated with these investigations.

Interviews with representatives of Brazilian firms revealed not only their distaste for external audits, but also the substantial cost. According to some experts, legal fees associated with the defense against antidumping accusations have averaged more than \$500,000 per company. One interviewee suggested that the total costs incurred by his company (including the opportunity cost of personnel assigned to gather the information requested by antidumping investigators) have been as high as \$3 million since 1986.

What have been the welfare effects of the unfair trade cases? In an earlier study of the U.S. specific duty on imports of frozen concentrated orange juice, Hufbauer, Berliner, and Elliot (1986) found that the gains to exporters from trade restrictions were negligible and that most of the welfare losses of \$130 million (in 1983 prices) were associated with the efficiency losses resulting from expanded, higher-cost production in the United States. This analysis was based on a simple partial-equilibrium model that assumes that the imported and domestic goods are imperfect substitutes and that the supply that of imports is perfectly elastic. The results imply that the welfare effects on Brazilian exporters of the much lower duties resulting from unfair trade actions must have been insignificant.

Conclusion

The Brazilian frozen concentrated orange juice industry was able to expand rapidly despite high levels of protection in its major markets -- particularly in the United States -- and erratic changes in Brazilian policies at both macro and micro levels. This dynamism is explained not only by Brazil's comparative advantage in production, but also by the fortuitous (from the perspective of Brazilian producers) occurrence of consecutive climate shocks to Florida's orange groves.

Despite the high profitability of the industry over most of the 1980s, major entry barriers make it unlikely that any large new firms will enter the market. At the same time, production of frozen concentrated orange juice is

expected to increase substantially in Brazil and Florida, barring any adverse exogenous shocks.

Unfair trade cases against Brazilian firms had little direct impact on output or price levels. Apparently, however, they created incentives for the adoption of practices that promote oligopolistic coordination among Brazilian firms. The widespread adoption of participation contracts between orange growers and the industry and the avoidance of price-discrimination practices in the international markets are good examples of these effects. And to the extent that these unfair trade cases fostered the market power of Brazilian frozen concentrate producers, they increased the likelihood of additional long-term welfare costs to consumers worldwide.

The folly of these unfair trade actions is particularly evident from their impact on its supposed beneficiaries -- the U.S. citrus industry. The antidumping cases were basically used to protect orange growers and higher-cost frozen concentrate producers at the expense of U.S. juice and soft drink processors and distributors linked by marketing arrangements to Brazilian concentrate exporters. Its main effect has probably been to strengthen the oligopoly-oligopsony relationship between Brazilian producers and their U.S. partners, as suggested by their joint defense strategy in the antidumping investigation, further hindering the prospects for competition in the world market for frozen concentrated orange juice.

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Table 6.1 Frozen concentrated orange juice production in Florida and Sao Paulo, 1961-87
(in thousands of metric tons at 65 degrees Brix)

<i>Year</i>	<i>Florida</i>	<i>Sao Paulo</i>	<i>Year</i>	<i>Florida</i>	<i>Sao Paulo</i>
1961	265.7	--	1975	561.0	189.0
1962	364.8	--	1976	586.5	211.0
1963	162.6	6.0	1977	497.6	229.0
1964	169.0	5.0	1978	507.6	400.0
1965	279.8	8.0	1979	545.0	424.0
1966	241.8	14.0	1980	728.2	479.0
1967	414.8	22.0	1981	526.5	586.0
1968	263.5	33.0	1982	386.6	550.0
1969	326.7	29.0	1983	491.8	508.0
1970	393.4	48.0	1984	351.6	726.0
1971	394.1	80.0	1985	348.6	848.0
1972	422.6	107.0	1986	384.0	600.0
1973	554.4	121.0	1987	422.0	750.0
1974	541.1	170.0			

Source: U.S. Department of Agriculture.

Table 6.2 Processing capacity of frozen concentrated orange juice plants, in the state of Sao Paulo, selected years, 1965-87 (1000 boxes of oranges)

<i>Year</i>	<i>Processing capacity</i>
1965	5.2
1970	16.0
1975	57.6
1976	76.4
1985	268.0
1986	273.6
1987	344.1

Note: A Brazilian plant typically processes 285 boxes of oranges to produce 1 metric ton of frozen concentrated orange juice at 65 degrees Brix.

Sources: U.S. Department of Agriculture, Food and Agriculture Services; Institute of Agricultural Economics, State of Sao Paulo.

Table 6.3 Brazilian prices of frozen concentrated orange juice, 1963-89
(U.S. dollars per metric ton at 65 degrees Brix)

<i>Year</i>	<i>Average price (fob Santos)</i>	<i>Minimum export price</i>	
		<i>Price</i>	<i>Month^a</i>
1963	408	na	
1964	378	na	
1965	327	na	
1966	340	na	
1967	359	na	
1968	386	na	
1969	469	na	
1970	440	na	
1971	464	na	
1972	476	na	
1973	526	na	
1974	546	560	February
1975	454	350	
1976	481	350	
1977	829	350	
1978	963	350	
1979	980	350	
1980	844	900	May-November
1981	1,031	na	
1982	1,100	1,200	
1883	1,099	1,100	December
1984	1,563	1,250	January
		1,300	March
		1,450	March
		1,600	July
		1,700	October
1985	1,545	1,800	January
		1,400	June
		1,150	November
1986	844	1,000	January
		800 ^b	March
1987	1,100	na	
1988	1,724	na	
1989	1,395	na	

na indicates that no minimum export price was in force.

a. Month new price was introduced. In 1980, the minimum export price was in effect from May to November, and the scheme was then discontinued for a while.

b. Export license price, established for calculating amount of resources that had to be repatriated.

Source: Brazilian Foreign Trade Bureau.

Table 6.4 Value of exports (fob) in major markets for Brazilian frozen concentrated orange juice, selected years, 1975-88
(thousands of U.S. dollars)

<i>Year</i>	<i>Australia</i>	<i>Canada</i>	<i>European Community</i>	<i>United States</i>	<i>Other markets</i>	<i>Total</i>
1975	na	9,865	45,212	9,042	18,085	82,204
1980	7,282	33,865	181,688	66,787	49,030	338,652
1981	4,447	85,689	299,696	268,439	876	659,147
1982	11,984	22,936	159,996	328,235	50,237	573,388
1983	15,026	36,476	223,898	281,822	50,648	607,930
1984	19,903	70,725	356,494	901,392	65,986	1,414,500
1985	3,625	37,446	217,676	436,602	53,576	748,925
1986	3,360	41,525	259,462	350,308	27,531	628,186
1987	0	66,440	370,730	359,808	33,521	880,499
1988	10,548	80,103	548,210	459,731	45,740	1,144,332

Source: Brazilian Foreign Trade Bureau and Abrassucos.

Table 6.5 Selected macroeconomic indicators for the Brazilian economy, 1970-89

<i>Year</i>	<i>Current account (US\$ mil.)</i>	<i>Growth of real GDP</i>	<i>Real exchange rate index^a</i>	<i>Trade balance (US\$ mil.)</i>	<i>Inflation rate^b (%)</i>
1970	-562	--	87.3	232	19.8
1971	-1,307	11.3	90.4	-341	18.7
1972	-1,489	11.9	93.4	-244	16.8
1973	-1,688	14.0	84.7	7	16.2
1974	-7,122	8.2	77.1	-4,690	33.8
1975	-6,700	5.2	77.2	-3,540	30.1
1976	-6,062	10.3	74.2	-2 147	48.2
1977	-4,038	4.9	73.4	97	38.6
1978	-6,991	5.0	83.4	-1,024	40.5
1979	-10,743	6.8	84.1	-2,840	76.8
1980	-12,807	9.2	94.4	-2,830	110.2
1981	-11,735	-4.4	79.5	1,202	95.2
1982	-16,310	0.7	74.0	780	99.7
1983	-6,837	-3.4	98.7	6,470	211.0
1984	45	5.0	100.0	13,089	233.8
1985	-241	8.3	102.8	12,406	235.1
1986	-5,304	7.5	103.9	8,305	65.0
1987	-1,428	3.6	97.2	11,173	415.8
1988	4,889	0.0	93.4	19,184	1,037.6
1989	1,424	3.6	73.1	16,111	1,782.9

a. Real exchange rate in terms of the U.S. dollar, taking the OECD GDP deflator as an index of world prices and the Brazilian GDP deflator as an index of domestic prices.

b. Yearly growth of general price index-FGV.

Sources: Central Bank of Brazil, World Bank (1989), *Conjuntura Economica*, and authors' calculations.

Table 6.6 Major world exporters of frozen concentrated orange juice, selected years, 1970-87
(metric tons at 65 degrees Brix)

Country	1970		1974		1978		1983		1987	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Brazil	33.47	18.4	108.46	35.9	335.63	65.6	553.11	73.5	754.80	73.3
United States	33.29	18.3	50.48	16.7	45.59	8.9	51.46	6.8	40.19	3.9
Israel	18.23	10.0	38.63	12.8	33.92	6.6	94.04	12.5	142.72	13.9
Spain	18.21	10.0	18.20	6.0	19.39	3.8	6.02	0.8	9.58	0.9
Italy	25.70	14.1	16.70	5.5	9.36	1.8	12.04	1.6	22.57	2.2
Morocco	22.91	12.6	12.39	4.1	10.64	2.1	9.48	1.3	11.03	1.1
Others	30.12	16.5	57.53	19.0	56.68	11.1	26.26	3.5	49.56	4.8
Total	182.09	100.0	302.29	100.0	511.55	100.0	752.33	100.0	1,030.44	100.0

Note: Figures may not add up to totals because of rounding.
Sources: Irias (1981) and Butler (1988).

Table 6.7 Market concentration ratios in the Brazilian frozen concentrated orange juice industry, 1983-85
(percentage shares)

<i>Firm</i>	<i>1984</i>		<i>1985^a</i>		<i>1983 Processing capacity^b</i>
	<i>Export quantities</i>	<i>Export revenue</i>	<i>Export quantities</i>	<i>Export revenue</i>	
Sucocitrico Cutrale	40.7	40.9	35.1	34.7	30.4
Citrosuco Paulista, SA	31.9	31.8	36.3	36.4	34.4
Cargill Citrus, Ltda.	12.9	13.2	10.1	9.9	15.4
Frutesp, SA	6.6	6.4	5.2	5.7	9.5
Concentration ratio	92.1	92.3	86.7	86.7	89.7

a. January-November.

b. Six and one-half months of operation a year.

Source: Brazilian Foreign Trade Bureau; U.S. Department of Agriculture.

Table 6.8 Orange production in Sao Paulo, 1979/80-1989/90

<i>Season</i>	<i>Nonbearing trees (thousands)</i>	<i>Bearing trees (thousands)</i>	<i>Production (million boxes^a)</i>	<i>Yield (boxes^a/tree)</i>
1979/80	29.80	63.79	155	2.43
1980/81	31.08	67.53	170	2.52
1981/82	31.69	69.99	180	2.57
1982/83	30.28	74.34	195	2.62
1983/84	22.84	87.06	200	2.30
1984/85	26.13	86.24	205	2.38
1985/86	30.23	88.62	239	2.70
1986/87	33.43	91.96	220	2.39
1987/88	35.12	95.86	220	2.30
1988/89	40.51	99.23	210	2.12
1989/90	45.88	105.45	206	1.95

a. Ninety-pound boxes.

Source: Brown (1987) and FAO (1989b).

**Table 6.9 On-tree orange prices, Sao Paulo and Florida
(U.S. dollars per box)**

<i>Season</i>	<i>Sao Paulo</i>	<i>Florida</i>	<i>Florida/ Sao Paulo</i>
1975/76	0.90	1.77	1.97
1976/77	0.85	2.17	2.55
1977/78	2.00	4.14	2.07
1978/79	1.72	4.65	2.70
1979/80	1.70	3.71	2.18
1980/81	1.65	4.08	2.47
1981/82	2.12	4.28	2.02
1983/84	0.97	5.79	5.97
1984/85	2.10	7.75	3.69
1985/86	3.74	3.68	0.97
1986/87	1.15	4.69	4.08
1987/88	1.42	8.63	6.08

Note: Florida production season is December to November; Brazil production season is July through June.

Sources: Florida Crop and Livestock Reporting Service, Florida Citrus Mutual, and Institute of Agricultural Economics, State of Sao Paulo.

Table 6.10 Current import tariffs on orange juices in selected importing countries

<i>Region/country</i>	<i>Product description</i>	<i>Import tariff</i>	<i>Comments</i>
North America			
Canada	<ul style="list-style-type: none"> ■ orange juice ■ blended orange-grapefruit juice ■ unsweetened orange-grapefruit concentrate 	<ul style="list-style-type: none"> ■ 3 percent ad valorem ■ 3 percent ad valorem ■ free 	Most favored nation rates
United States	<ul style="list-style-type: none"> ■ nonconcentrated citrus juices ■ concentrated citrus juices 	<ul style="list-style-type: none"> ■ 20 cents a gallon ■ 35 cents a gallon (on single-strength equivalent) 	Imports from Caribbean Basin Initiative countries are eligible for duty-free entry
Western Europe			
European Community	<ul style="list-style-type: none"> ■ orange juice of a density exceeding 1.33 g/cm₃ at 20° C ■ orange juice of a density of 1.33 g/cm₃ or less at 20° C, of a value exceeding 30 ECU/100 kg 	<ul style="list-style-type: none"> ■ 42 percent ad valorem ■ 19 percent plus additional duty on sugar content 	Preferences for Algeria, Cyprus, Israel, Morocco, Tunisia, and Turkey ACP free
Austria	<ul style="list-style-type: none"> ■ concentrated citrus juices in containers of 20 liters or more ■ concentrated citrus juices in other containers 	<ul style="list-style-type: none"> ■ 105 schillings per 100 kilograms ■ 420 schillings per 100 kilograms 	
Eastern Europe			
Bulgaria	<ul style="list-style-type: none"> ■ all citrus juices 	<ul style="list-style-type: none"> ■ 15 percent ad valorem 	Preferences for developing countries Preferences for developing countries Preferences for Cuba and other developing countries
Czechoslovakia	<ul style="list-style-type: none"> ■ all citrus juice 	<ul style="list-style-type: none"> ■ 3.75 percent ad valorem 	
Hungary	<ul style="list-style-type: none"> ■ all citrus juices 	<ul style="list-style-type: none"> ■ 20 percent ad valorem 	
Poland	<ul style="list-style-type: none"> ■ all citrus juices 	<ul style="list-style-type: none"> ■ 5 percent ad valorem 	
Romania	<ul style="list-style-type: none"> ■ all citrus juices 	<ul style="list-style-type: none"> ■ 40 percent ad valorem 	
Other developed countries			
Japan	<ul style="list-style-type: none"> ■ orange juice, containing added sugar (not more than 10 percent by weight of sucrose) ■ other orange juice 	<ul style="list-style-type: none"> ■ 30 percent ad valorem ■ 25 percent ad valorem 	
Australia	<ul style="list-style-type: none"> ■ orange juice 	<ul style="list-style-type: none"> ■ 10 percent ad valorem plus specific duty related to total soluble solids content and domestic support price 	Ad valorem equivalent of the composite duty was about 30 percent in 1987
Near East			
Dubai	<ul style="list-style-type: none"> ■ imports by sea ■ imports by air 	<ul style="list-style-type: none"> ■ 3 percent ad valorem ■ 2 percent ad valorem 	
Egypt	<ul style="list-style-type: none"> ■ all citrus juices 	<ul style="list-style-type: none"> ■ 150 percent ad valorem 	
Saudi Arabia	<ul style="list-style-type: none"> ■ all citrus juices 	<ul style="list-style-type: none"> ■ 7 percent ad valorem 	
Far East			
Malaysia	<ul style="list-style-type: none"> ■ all citrus juices 	<ul style="list-style-type: none"> ■ 25 percent ad valorem 	
Singapore	<ul style="list-style-type: none"> ■ all citrus juice 	<ul style="list-style-type: none"> ■ free 	

Source: FAO (1989b).

Notes

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1. The Brix scale was developed in the nineteenth century by the German chemist Adolf F.W. Brix. It measures the amount of solids (basically, sugars) that are diluted in the juice. Freshly squeezed orange juice would normally be at 12 degrees Brix -- 12 kilograms of solids for every hundred kilograms of water.

2. For details on the early history of the Brazilian citrus industry, see Martinelli (1987) and Hasse (1987).

3. Presently, than 80 percent of Brazil's orange groves are in Sao Paulo. In the northern region of the state, more than 145 million trees (about 70 percent of them in a fruit-bearing stage) cover an area of about 52,000 square kilometers. The trees are owned by some 25,000 growers, and even though the influence of large producers has been increasing over time, orange production remains quite dispersed. In the early 1980s, orange groves with a maximum area of 100 hectares still accounted for more than 40 percent of the oranges produced in the state. This fragmented structure of production for oranges is in sharp contrast with the highly concentrated structure of the frozen concentrate industry, a fact that has given rise to the "love-hate" relationship between them.

4. Until then, West Germany and the Netherlands had been the main markets for Brazilian frozen concentrated orange juice. During 1970-76, for instance, West Germany and the Netherlands bought 31 and 20 percent, respectively, of Brazilian exports.

5. For further details see, for example, Martone and Primo Braga (1988).

6. Fiscal incentives for reforestation projects were introduced as a support program for the paper and pulp industry. But since the original regulations did not bar the use of these resources for planting fruit-bearing trees, orange growers were able to use this program to plant 9,000 hectares of orangeries between 1968 and 1976, when this loophole was closed. For further details, see Hasse (1987, 205-6).

7. The last one to disappear was the income tax exemption on export profits. In 1989, exporters began to pay a 3 percent income tax on export-related profits; the rate was raised to 6 percent in 1990.

8. The state of Sao Paulo has a history of support to agricultural research that goes back to the 1930s. This research, carried on by institutions like the Instituto Biologico, was critical to the control of several diseases that afflicted citrus trees (see Hasse 1987).

9. The investigation by the Conselho Administrativo de Defesa Economica, the government unit in charge of controlling abuses of economic power, dismissed the charges in 1981 (see Hasse 1987, 249-50).

10. All dollar values refer to U.S. dollars.

11. The Foreign Trade Bureau was charged with supervising implementation of the agreement (see Duran and associates 1981).

12. The economics of U.S. imports of frozen concentrated orange juice from Brazil are detailed by Ward (1976).

13. Data on the changes in the installed capacity of the Brazilian frozen concentrated orange juice industry are frequently reported by *Revista Citrus*.

14. U.N., *International Trade Statistics Yearbook* (various issues). Revealed comparative advantage is defined as $(X_{i,n}/X_n) / (X_{i,w}/W_w)$, where $X_{i,n}$ = Brazilian exports of industry i ; X_n = total Brazilian exports of manufactured goods; $X_{i,w}$ = world exports of industry i ; and X_w = total world exports of manufactured goods.

15. The specific duty rate is applicable to orange juice in its natural form. For concentrated juice, the duty is levied on the number of gallons of reconstituted single-strength juice that can be produced from a gallon of the concentrate.

16. The import duty on nonconcentrated orange juice or reconstituted juice with a concentration lower than 1.5 is 20 cents a gallon (see Hufbauer, Berliner, and Elliot 1986, 100).

17. Brazil was subjected to a higher level of antidumping and countervailing duty actions per dollar exported than most developing countries over the 1980s. Finger and Messerlin (1989, 6), for instance, have asserted that among major developing country exporters, Brazil "is the only one whose share of U.S. unfair trade cases is far above its share of the U.S. import market; 7 percent versus 2 percent" for the 1980-88 period.

18. Unless otherwise stated, the information on the countervailing duty investigation comes from USITC (1983, 1984).

19. The usual forty-five calendar-day period for issuing a preliminary determination was extended in this case, which was classified as "extraordinarily complicated."

20. This estimate was derived as follows: first, the amount of financing obtained by producers under Resolution 674 was multiplied by the difference between prevailing market interest rates and the preferential Resolution 674 rate. This result was then divided by the value of exports as a proxy for the ad valorem subsidy. All calculations were based on data for fiscal year 1981.

21. The Brazilian government, by pursuing a suspension agreement, was in essence buying an "insurance policy" against the possibility of a tougher final determination.

22. The ITC determination was based on a 1 to 1 vote, with one commissioner finding that the U.S. industry was threatened with material injury by imports of "subsidized" Brazilian frozen concentrated orange juice and the other commissioner dissenting.

23. Unless otherwise stated, information on antidumping cases was derived from USITC (1986, 1987, 1989) and Australian Customs Service (1987).

24. Figures are based on information provided by U.S. Department of Agriculture reports ("Brazil Citrus") and Martinelli (1987).
25. Over the previous five seasons, the ending carryover had averaged 39,600 metric tons.
26. The investigation was based on Cutrale's and Citrosuco's sales of frozen concentrated orange juice in the U.S. market from November 1, 1985, through April 30, 1986. For Citrosuco, the exporter's sales price (representing the U.S. price) was compared with Citrosuco's sales to Canada, or constructed values. For Cutrale, purchase price figures were used to represent the U.S. price and sales in the Brazilian domestic market provided the benchmark for the foreign-market value. For further details, see USITC (1987, R-2/R-3).
27. See *Citrosuco Paulista v. United States*, 12 CIT, 704 F. Supp. 1075 (1988).
28. *Citrosuco Paulista v. United States*, 12 CIT, 704 F. Supp. 1085 (1988). A recent decision of the U.S. Court of International Trade, however, confirmed the interpretation that a petitioner in antidumping and countervailing duty investigations must "show that a majority of its industry supports its petition." According to some analysts, if the frozen concentrated orange juice antidumping case were initiated today, Brazilian companies would probably achieve better results using the "majority support" argument. Yet, it remains to be seen whether this new interpretation will be upheld in the courts. For details, see *Suramerica de Aleaciones Laminadas, C.A. et al. v. United States* (*Customs Bulletin and Decisions* 24, [September 1990]: 3-22).
29. A recent administrative review of the antidumping duty on frozen concentrated orange juice found the following weighted average dumping margins for the period May 1, 1988 through April 30, 1989: Citrosuco Paulista, S.A., 0.06 percent; Cargill Citrus, Ltda., Coopercitrus Industrial Frutesp, S.A., and Montecitrus Trading, S.A., zero. Since the margins found were either zero or (in the case of Citrosuco) negligible, cash deposits are no longer required for shipments from these manufacturers as of November 14, 1990 (see USITC 1990).
30. Australia's highest share in Brazil's export revenues from frozen concentrated orange juice was 2.47 percent, reached in 1983.
31. The concept of NIFOB is consistent with Article 8 of the GATT Antidumping Code, which allows the duty to be "less than the margin, if such lesser duty would be adequate to remove the injury to the domestic industry."
32. Since August 1984, the subsidies provided through preferential financing for exports have been significantly reduced as the system of export credits was privatized. While the Foreign Trade Bureau continued to offer an interest rate equalization plan -- financed by Fundo de Financiamento a Exportacao, a Central Bank fund -- that provided subsidized loans for exporters, the system collapsed in 1988, when its resources dried up. For further details, see Piani and Pereira (1990).
33. It is also important to note that possibilities for international price arbitrage exist, despite the pervasiveness of one-to-one marketing arrangements between Brazilian producers and major distributors in the United States and Japan. For details concerning the price performance of Brazilian frozen concentrated orange juice in European markets, see Graham (1987).

34. The role of the New York futures market in terms of direct international price arbitration in frozen concentrated orange juice remains limited, however. Only a small proportion of worldwide frozen concentrate transactions are intermediated by this market, which is dominated by Florida producers (physical delivery of the product exclusively to Florida ports is required). For further details on the functioning of the futures market in frozen concentrated orange juice, see Ward and Kilmer (1989).

35. For a theoretical analysis of the economic rationales for dumping see, for instance, Deardorff (1989).

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