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Redesigning the Food Chain: Trade, Investment and Strategic Alliances in the Orange Juice Industry

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Abstract

Change in trade barriers and capital flow creates opportunities for redesigning the food chain. The orange juice chain in U.S. and Brazil provides an interesting illustration of how institutional harmonization, high import tariff rates and complementary capabilities open new opportunities for strategic alliances and the re-arrangement in the FCOJ chain. This finding has the following implications. First, trade barriers are not enough to support FDI and related internationalization decisions. Second, the perspective of market integration creates a positive environment for new strategic alliances and the re-design of the food chain. And third, the existence of complementary capabilities between foreign and domestic companies is a necessary condition for this type of supply chain re-arrangement.

Keywords: FTAA, foreign direct investment, Orange Juice Industry, strategic alliances

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Introduction

Change in trade barriers and capital flow creates opportunities for redesigning the food chain. In the most prominent view, trade barriers foster foreign direct investment (FDI) as an alternative to explore competencies that may be replicated in the host country (Dunning, 1998). Inasmuch as the relative cost of exporting increases when trade barriers are high, firms may prefer to expand its sales by investing in a new plant in the host country. As a consequence, the higher the trade barriers, the higher FDI will be. On the other hand, the institutional harmonization that emerges with market integration – including lower trade barriers – promotes FDI because firms are more likely to invest when they know the rules that govern market competition. Moreover, the institutional environment tends to be more stable in integrated economies, with a positive effect on investment level. Regional trade blocks such as NAFTA and Mercosur are illustrative cases where lower trade barriers were associated to an increase in FDI.

More important than knowing which effect prevails for a given level of trade barriers is that the perspective of market integration may combine both effects in the same direction. We submit that the orange juice chain in the United States (US) and Brazil, the dominant players in the global frozen concentrated orange juice (FCOJ) market, provides an interesting illustration of how change in market integration provides incentives for FDI and the redesign of the food chain. In particular, we argue that supply chain redesign in the form of vertical desintegration and cross-boder strategic alliances allows participants to deeply explore existing capabilities. This study explores FDI by western hemisphere food processors in the US market with focus on the FCOJ industry in Florida and Brazil's southeastern region, particularly the state of Sao Paulo. In order to address these issues, we first discuss the FCOJ industry structure in the relevant markets.

Industry Structure

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

Since its beginning, the Brazilian orange juice industry has been connected to its Florida counterpart. 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 to the US market. US companies arrived in Brazil with capital and technology, and formed strategic alliances with packinghouse owners that had access to orange growers.

Forty years later, the Brazilian orange juice industry is the largest in volume and the most competitive in the world. Brazilian FCOJ exports account for 85% of total international trade despite high tariff rates in major export markets, including in the US, in the European Union (EU) and in Southeast Asia. The competitiveness of the FCOJ industry in Brazil 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 because orange juice deliveries are dispersed in several distribution channels.

The Brazilian orange juice industry is highly concentrated, since the four leading processors control over 85% of total crushing capacity. Two family-owned domestic companies founded in the 1960s as packing houses have a combined 60% share of total industry crushing capacity. The third ranked company is the French multinational Dreyfus with a 12% share, followed by Citrovita, another Brazilian based company, with 11%. The concentration in crushing capacity is similar to the one observed in FCOJ exports, with smaller changes due to idle capacity or toll processing contracts between some processors and growers' pools (Neves, Marino and Nassar, 2002). Concentration has been rising due to the ongoing consolidation process. In 2004 industry leaders Citrosuco and Cutrale acquired Cargill's assets in its Brazilian citrus division, which used to be the third ranked company. This transaction was approved by the Brazilian Competition Policy Agency (CADE) in 2005 (Brazilian Ministry of Finance, 2005).

The main variable that dictates competition in the FCOJ industry is control of the bulk transportation system. 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.

It is also noteworthy that the Brazilian FCOJ industry has some features that make tacit collusion more likely. Not only is market concentration high, but also FCOJ is a homogeneous product with low price elasticity, stable demand and slow

technological change. Taken together, these industry structure characteristics reduce coordination costs among firms (homogeneous product and stability of demand and technology) and increase the benefits of cooperation (low price elasticity) thereby favoring industry coordination (Viscusi, Vernon and Harrington, 1997).

With regard to the US industry structure, data are available for the industry defined as frozen fruit, juice and vegetable manufacturing (NAICS code 311411) as the US Census of Manufacturers does not provide disaggregated data for the FCOJ industry. There are 177 processors in this industry with combined value of shipments reaching US$10 billion. The four largest processors account for 34% of total industry shipment value.

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%. Citrus World, a marketing cooperative formed by citrus packinghouses in Florida, owns the third largest orange juice brand called Florida's Natural (Jacobs, 1994).

The four leading companies in Brazil are key players in the Florida industry, following the acquisition of incumbent plants during the 1990s. Since their entry in the US market, the two largest orange juice brands (Minute Mate and Tropicana) have discontinued crushing and focused in blending and marketing consumer-ready products. This strategic movement is analyzed in detail in the next section.

Vertical Coordination

There are several private organizational arrangements to govern transaction hazards. Transaction Costs Economics (TCE) has the merit of providing a model that, given the characteristics of a particular transaction, predicts the adopted governance structure. The argument initially presented by Williamson (1985) – and maintained in subsequent work (Williamson, 1991; 1996) – matches transaction dimensions (asset specificity, frequency and uncertainty) to the choice of a singular governance structure (market, hybrid or hierarchy), which is the most efficient among the set of possible structures in mitigating transactions costs.

The transactions between growers and crushing firms, both in the US and Brazil, are predominantly governed by non-market mechanisms. Oranges are highly perishable, which leads to temporal asset specificity, and the volume produced by growers and required by crushing firms is much greater than alternative sources of supply and demand for oranges, making assets dedicated to each other. In the

presence of such high levels of asset specificity it is expected that firms will employ governance structures that provides greater control over the transaction such as contracts and vertical integration (Williamson, 1985).

Indeed, 95% of citrus fruits in the US 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 (Harris et al., 2002). The degree of vertical integration was higher in the late 1980s. In part, the reduction in vertically integrated orange production and processing in Florida is associated with the acquisition of crushing plants by Brazilian firms.

The coexistence of marketing contracts and vertical integration is also evident in the Brazilian orange industry, with two remarkable differences relative to the US: (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 (volume) 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).

Trade Barriers for FCOJ

Tariff and non-tariff barriers are used differently by Brazil and the US. Whereas the former generally levies higher average tariffs, the latter imposes lower average tariffs but with higher standard deviation. Additionally, 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 producers. Consequently, the US tends to be more open to international trade while heavily protecting selected industries against foreign competition. Among those is the FCOJ industry, which receives protection against imports from several countries but particularly from the competitive Brazilian FCOJ industry.

Table 1 summarizes the available information supporting the distinctions drawn between the US and Brazil. Tariff rates applied to agrifood 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 US. In addition, the standard deviation of agrifood industry tariff rates levied in the US 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 US 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 1: Summary of Tariff Schedules for Brazil and the US

	Brazil		US	
	Total	*Agri-Food*	*Total*	*Agri-Food*
Number of items	9,408	1,165	10,311	2,102
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: 115) point out, the US strategy of "chirurgic protection impacts directly the main export products of the Brazilian agri-system." The orange juice is a remarkable example of this type of protection. 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[1] gallon for FCOJ and US$0.175 per SSE gallon for not-from-concentrate (NFC) orange juice. As tariff rates for FCOJ are a fixed amount for a given volume, the effective protection increases when the price of the FCOJ falls and decreases when it becomes more expensive. For the average price observed in 2002, the specific tariff rate for FCOJ and NFC was equivalent to an ad valorem tariff rate of 56.7% and 13.7% respectively (Neves, Marino and Nassar, 2002). The effective protection of NFC seems lower but higher transportation costs provide an effective "natural" protection.

Table 2 presents the US import tariff rate for FCOJ for different countries in the last fifteen years and schedule until 2007. Two relevant conclusions may be drawn from the data. First, the protection of Florida's industry is not equitable as Mexico and Caribbean countries receive a favorable treatment as closer trading partners. Second, the tariff has been declining but there is no further perspective of lower trade barriers for Brazilian orange juice in the years ahead.

The changes in tariff rates in the last fifteen years had an important impact on US imports of FCOJ (Table 3). The main effect was a significant decrease in US imports in the beginning of the 1990s. The second effect was a reduction in the Brazilian share with concomitant increases in imports from Caribbean countries with no tariff protection. The expected fall of tariff rates on imports from Mexico after 2007 will probably have a negative effect on imports from Brazil. Also relevant is the perspective of hemispheric integration with the Free Trade Area of the Americas (FTAA), which will require increased institutional harmonization between its

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

member-countries. The scenario of deep changes in trading rules between Brazil and the US not only affected trade flows, but created new investment opportunities, particularly towards the redesign of the citrus chain, with remarkable consequences on trade and foreign direct investment. The next section further explores this issue.

Table 2: Tariff Rate Quota Schedule for Imported FCOJ To US (US$/SEE gallon)

Year	Mexico			Canada	Caribbean	Brazil
	In Quota (a)	OverQuota (b)	Snapback (c)			
1989	n/a	n/a	n/a	0.3143	Free	0.3502
1991	n/a	n/a	n/a	0.2423	Free	0.3502
1993	n/a	n/a	n/a	0.1742	Free	0.3502
1995	0.1751	0.3327	0.3415	0.1022	Free	0.3415
1997	0.1751	0.3152	0.3237	0.0341	Free	0.3237
1999	0.1751	0.2977	0.3059	free	Free	0.3059
2001	0.1751	0.2977	0.2972	free	Free	0.2972
2003	0.1751	0.2977	0.2972	free	Free	0.2972
2005	0.1751	0.1786	0.2972	free	Free	0.2972
2007	0.0595	0.0595	0.2972	free	Free	0.2972

a. Tariff applied to first 40 million single strength equivalent (SSE) gallons of FCOJ imports from Mexico.
b. Tariff applied to imports from Mexico exceeding 40 million SSE gallons of FCOJ up to 70 million SSE gallons from 1994 through 2002, and up to 90 million SSE gallons from 2003 through 2008.
c. Tariff applied to imports from Mexico exceeding 70 million SSE gallons from 1994 through 2002 and to imports from Mexico exceeding 90 million SSE gallons from 2003 through 2008 if a price trigger is also eclipsed (a price-based safeguard will provide for the reimposition of higher MFN tariffs if FCOJ daily average prices for 5 consecutive days fall below the previous 5-year average for that month).
Source: NAFTA, Office of the U.S. Trade Representative in Fernandes (2003).

Table 3: US Imports of FCOJ by Countries (US$ 1,000)

Country	1989	1991	1993	1995	1997	1999	2001	2003
Brazil	463,169	220,843	202,282	103,949	124,572	218,820	109,115	196,323
México	58,092	43,907	16,503	63,929	43,481	49,526	28,189	6,905
Costa Rica	0,656	1,736	2,448	6,984	18,096	16,461	33,718	35,608
Belize	8,532	4,029	6,695	8,389	16,089	13,077	19,667	11,304
Canada	0,257	0,918	2,115	2,963	2,466	4,224	4,867	5,569
Honduras	0,602	0,547	1,674	2,818	3,632	1,437	4,776	1,794
Dominican Rep.	0,000	0,296	0,578	0,495	1,317	0,160	1,416	1,903
Other countries	7,914	2,481	1,962	1,834	0,894	2,298	0,956	5,507
Total	**539,222**	**274,757**	**234,257**	**191,361**	**210,547**	**306,003**	**202,704**	**264,913**

Source: U.S. International Trade Commission (USITC).

Food Chain Redesign: Entry of Brazilian Processors in Florida

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 FCOJ exports to the US have been declining in both absolute and relative terms. In the 1990s the US 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 US 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 US. First, as previously mentioned, FCOJ is a sensitive product under protection of the US tariff rate system. Second, other countries enjoy preferential tariff rates, which reduce the competitiveness of Brazilian exports. Third, orange juice consumption in the US 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. Notwithstanding logistics barriers, Brazil began exporting NFC to the US in 2002 at approximately 3% of FCOJ exports.

The acquisition of US plants by processors based in Brazil 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 supply chain. Some beverage products use orange juice – in frozen, concentrated or pasteurized form – 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 food services. The recent acquisitions of US crushing plants by Brazilian firms are better understood as a reorganization of this supply chain in the US, 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). Although there is no technological similarity between processing carbonated soft beverages and FCOJ, those companies tend to be diversified in order to deeply explore intangible assets – such as brand name and marketing capabilities – that are key variables in their transaction with final consumers. As a consequence, their

main business is ready-to-drink beverages that require specific competencies in marketing and branding rather than in one specific beverage. By means of diversification, beverage companies are able to explore economies of scope in an extensive product line that make use of the same intangible assets. Among these assets, brand name, marketing research and access to marketing channels are noteworthy.

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 arguments help explain 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.

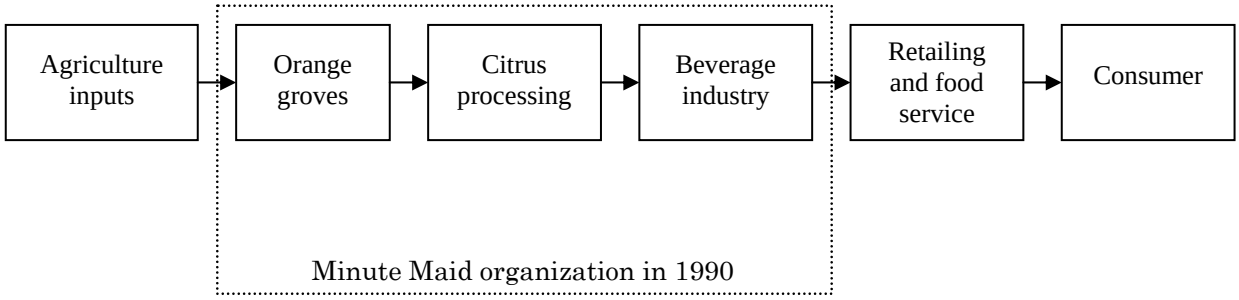

Figure 1: Orange Juice Production Chain

Figure 1 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. Upstream vertical coordination – e.g. vertical integration on orange groves – is further explored latter in this section.

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 processing 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 was 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). As already mentioned, Brazilian FCOJ exports to US has been decreasing for three main reasons: high tariff rates, preferential tariff rates for competing countries and the increased share of NFC juices in the US market. Nevertheless, we argue that decreasing exports

alone are not sufficient to explain why Brazilian companies were attracted to acquire Florida based companies.

We submit that two other factors are relevant to this strategic movement. First, there was a perspective of increasing integration in the western hemisphere with FTAA, which would lead to increased institutional harmonization. Second, Brazilian companies developed distinctive efficiencies in orange processing thatpartially explains these acquisitions. Besides having access to state-of-the-art orange crushing technology, the leading Brazilian companies also developed knowledge on logistics, lay-out and storage that were possible due to their larger scale. This capability could not be fully explored with plants located in Brazil as trade barriers and consumer trends towards NFC juices protect Florida production.

Table 4: 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).

What is remarkable in the orange juice case, however, is that Brazilian FCOJ processors and US beverage firms 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 focused on their core business in order to fully explore competencies in marketing – particularly in blends, branding and distribution channels – and 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 recent acquisitions by Brazilian companies are also evident in vertical coordination strategies between orange growers and processors. Table 4 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 were the dominant players in 2002, with a lower participation of vertically integrated grower-processors.

This industry arrangement differs from that observed in Brazil, where processors have their own orange groves, supplying on average 30% of their raw input needs (Table 5). Contrasting to the trends observed in Florida, the degree of vertical integration in Brazil, although always present, increased since the late 1980s. It is noteworthy that companies that operate in Brazil and Florida rely only on contracts with orange growers to supply US based plants, as opposed to their strategy of partial vertical integration in Brazil.

Table 5: Backward Vertical Coordination in Brazilian Citrus Processors

Company	Vertical Integration on Orange Groves (%)
Citrosuco	30
Cutrale	30-40
Dreyfus	15
Cargill	30
Citrovita	80

Source: Brazilian Orange Growers Association data in Brazilian Ministry of Finance (2005).

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

growers. Moreover, the organization of orange growers is quite different in the two countries, which may have consequences on vertical coordination strategies. While orange growers in Brazil count on collective organizations with weak conditions for promoting horizontal coordination (Marino and Azevedo, 2003), growers in the US are better organized and have access to political resources, which explain the persistence of protection against FCOJ imports. One of the important differences in the way growers organize themselves in both regions is the historical role of cooperatives in the US as opposed to the short-lived experience of Brazilian cooperatives in the orange juice chain – the most prominent case being Frutesp, which lasted 13 years until Dreyfus acquired it in 1991.

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.

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 US. 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.

Discussion and Conclusions

Trade barriers are traditionally seen as an incentive for FDI, which may be an alternative to exports as an internationalization strategy. This traditional view only partially explains the FDI activity of Brazilian orange juice firms. The perspective of market integration with continuing negotiations of FTAA signals a trend to institutional harmonization that affect firm-level investment strategies. The perspective of integration fosters FDI because firms tend to integrate foreign markets in their strategies, making room for strategic alliances and the 'reinvention' of food chains.

The two effects are rarely observed in conjunction, inasmuch as barriers are high or low. However, the Brazilian FCOJ industry experienced both effects: high trade barriers and the perspective of economic integration in the FTAA. As a consequence, firms expect institutional harmonization and market integration, opening new

opportunities for strategic alliances and the redesign of the food chain in general. Meanwhile, Brazilian orange juice firms face high import tariff rates and no perspective of significant tariff reduction in the near future. Thus there are strong incentives for them to redirect investments to orange crushing plants located in the US.

The strategic move observed in the FCOJ industry differs from those of other Brazilian food processors that cope with high trade barriers when exporting to the US. For example, the Brazilian poultry industry faces sanitary restrictions when exporting to the US, which should have a positive effect on direct investments in the US. This evidence suggests that the existence of significant trade barriers is not a sufficient condition for FDI.

The additional variable that explains FCOJ chain redesign is the existence of complementary capabilities among Brazilian crushing firms (particularly Citrosuco and Cutrale) and US beverage firms (Tropicana and Minute Maid). This was not the case of the main Brazilian poultry firms (Sadia and Perdigao), which have core capabilities that are similar to those of Tyson Foods and other US poultry processors. In short, the perspective of market integration creates opportunities to direct investment and strategic alliances as long as there are complementary capabilities to be explored in those new arrangements.

As there is a cost of redesigning a supply chain, the combination of FDI and strategic alliances occurs only when there are significant gains, such as exploring more intensely the relevant capabilities. This finding has relevant implications to agribusiness managers. First, trade barriers are not enough to support FDI and related internationalization decisions. Second, the perspective of market integration creates a positive environment, mainly due to institutional harmonization, for strategic alliances and the redesign of the food chain. And third, the existence of complementary capabilities between foreign and domestic companies is a necessary condition for this type of supply chain re-arrangement.

References

Brazilian Ministry of Finance, Ato de Concentração n. 08012.005419/2004-62 (Cutrale-Cargill), 2005.

Dunning, J.H. Explaining International Production. London: Unwin Hyman, 1998.

Fernandes, W.B. "Understanding Different Governance Structures: The Case of the Processed Orange Industries in Florida and Sao Paulo, Brazil," Working Paper, University of Florida, 2003.

Gibson, P., J. Wainio, D. Whitley and M. Bohman. "Profiles of Tariffs in Global Agricultural Markets," Agricultural Economic Report N° 796. Washington, DC: USDA Economic Research Service, 2001.

Harris, J.M., P.R. Kaufman, S.W. Martinez and C. Price. "The US Food Marketing System, 2002: Competition, Coordination and Technological Innovations into the 21st Century," Agricultural Economic Report N° 811. Washington, DC: USDA Economic Research Service, 2002.

Hodges, A., E. Philippakos, D. Mulkey, T. Spreen and R. Muraro. "Economic Impact of Florida's Citrus Industry, 1999-2000," Economic Information Report 01-2, University of Florida, 2001.

Jacobs, J.A. "Cooperatives in the US Citrus Industry," Research Report 137. Washington, DC: US Department of Agriculture, Rural Business Cooperative Service, 1994.

Jank, M.S., A.M. Nassar, Z. Arashiro, M. Jales and A. Santos. "A Política Agrícola dos Estados Unidos e seu Impacto nas Negociações Internacionais," Research Report, Washington, DC: IDB-Brazilian Foreign Affairs Ministry, 2001.

Marino, M.K. and Azevedo, P.F. "Avaliação da Intervenção do Sistema Brasileiro de Defesa da Concorrência no Sistema Agroindustrial da Laranja," Gestão e Produção 10(1), 2003.

Neves, M.F., M.K. Marino and A.M. Nassar. "Cadeia: Citros," in L. Coutinho (coord.), Estudo da Competitividade de Cadeias Integradas no Brasil: Impactos das Zonas de Livre Comércio, UNICAMP-IE-NEIT/MDIC/MCT, 2002.

US International Trade Commission - USITC. Trade statistics available at http://www.dataweb.usitc.gov. 2003.

Viscusi, W.K., Vernon, J.M., Harrington, J.E. Economics of Regulation and Antitrust, Second Edition, Cambridge: MIT Press, 1997.

Williamson, O.E. "Comparative economic organization: the analysis of discrete structural alternatives," Administrative Science Quarterly, 36: 269-296, 1991.

Williamson, O.E. Mechanisms of Governance, New York: Oxford University Press, 1996.

WILLIAMSON, O.E.The Economic Institutions of Capitalism, New York: Free Press, 1985.

