Development Policy Review, 2002, 20 (4): 441-457

Consolidation, Multinationalisation, and Competition in Brazil: Impacts on Horticulture and Dairy Products Systems

*Elizabeth M. M. Q. Farina**

This article examines the rapid consolidation and multinationalisation of the supermarket sector in Brazil over the past decade. The impact of this on the horticulture marketing system is shown to include a sharp reduction in the role of traditional wholesale markets, the rise of specialised wholesalers and distribution centres, and the beginnings of contracts with growers. There have been similar changes in the dairy processing sector, with huge impacts on the dairy products systems leading to substantial concentration 'upstream' in the chain. For small farms and firms in both sectors, there is a need for substantial improvements in organisation and technology to face these challenges, and the government has a role in helping them make this adjustment.

This article focuses on the three interlinked forces of consolidation, multinationalisation, and competition that have profoundly changed the Brazilian agrifood system in the past decade, causing firms to make strategic changes in the organisation of the supply chain, to increase co-ordination, reduce costs, and raise quality, with important effects on the upstream segments in the chain, such as the farmers. It starts by looking at the general changes in the 'downstream' segments of the agribusiness system, in particular the rise of supermarkets and fast-food chains, the emergence of fresh-cuts companies, and the consolidation of food processing. It then focuses on two case studies, fresh fruit and vegetables (FFV) and dairy products, to examine the effects on small farms and firms. These examples are used because demand for them is growing quickly, and because many small processors and farmers are involved in these chains.

We work from the general notion that agriculture is part of a broader 'agribusiness system', a concept that emphasises the co-ordination and organisation aspects of a supply chain. This system conditions firms' strategies, performance, and adoption of adequate controlling structures, such as formal and informal contracts linking the different segments (from farmer to retailer) and governing transactions in order to transmit information, provide incentives for, and monitor actions by chain participants. Strategies such as tough price competition, market segmentation, product differentiation, and innovation may cause important changes in transaction attributes and costs, thus requiring new structures throughout the system.

*Elizabeth Farina (emmqfari@usp.br) is at the University of São Paulo, Brazil.

Published by Blackwell Publishers, Oxford OX4 1JF, UK and 350 Main Street, Malden, MA 02148, USA.

Retail consolidation and new competition patterns

Overview of supermarket sector

Supermarkets are a very important part of retailing in Brazil. In 1999/2000, there were 327,192 retail shops; of these, 57,754 were self-service shops (with 86.8% of all retail sales), 5,258 of which were supermarkets or hypermarkets (with five cash registers or more) with 56% of total retail sales and 65% of self-service sales. The other 52,496 were other self-service shops, comprising small supermarkets (included in the Brazil AC Nielsen definition of supermarkets based on sales rather than on number of cash registers), convenience stores, and small neighbourhood shops (www.acnielsen.br and wwww.abrasnet.com.br).

The supermarket sector has consolidated rapidly over the past decade, mainly via mergers and acquisitions. In 1994 the five largest chains had 23% of the sector, and by 1999 the share was 40% (compared with 45% in Argentina and 34% in Chile) (AC Nielsen, 2000). Table 1 shows that in only five years, 1994-2000, the concentration ratio for the 10 largest supermarket chains almost doubled; by 2000, these 10 earned 46.8% of total supermarket revenues, food and non-food.

Table 1: Concentration of supermarket distribution and market share evolution, 1994-2000 (%)

Ranking 2000	Ranking 1999	Supermarkets	1994	1996	1999	2000
1	2	Pão de Açúcar (partnership with Casino – 1999)	6.5	7.4	12.9	14.1
2	1	Carrefour (French)	9.4	10.4	13.1	14.1
3	4	Bompreço (Dutch Royal Ahold – 2000)	2.4	2.6	4.4	4.5
4	3	Sonae (Portuguese)	-	-	4.7	4.4
5	5	Sendas	2.6	3.4	4.0	3.7
6	6	Wal-Mart (US)	-	-	1.6	1.8
7	7	Jeronimo Martins/Sé (Portuguese)	0.8	1.0	1.2	1.4
8	8	Cia Zaffari	0.9	1.3	1.1	1.1
9	9	C. Barbosa & Cia Ltda	0.5	0.6	0.8	0.9
10	10	Co-operativa de Consumo	-	-	0.8	0.8
		10 largest	24.3	28.4	44.6	46.8
		10 largest in 1999	23.1	26.7	44.6	46.8

Source: Brazilian Supermarket Association (www.abrasnet.com.br).

Consolidation and multinationalisation accelerated after monetary stabilisation with the Plan Real of 1994, a key determinant of foreign direct investment by multinational supermarket chains. Stabilisation drove down inflation (important for a company's relationship with its subsidiaries), and drove up incomes, making Brazil an attractive

market. Table 1 shows that, among the 10 largest supermarkets, 6 have foreign participation, 5 with multinationals and one a joint venture Companhia Brasileira de Distribuição between a Brazilian firm (Pão de Açúcar – 'Sugarloaf' in English) and Casino (France).

Leading chains (a chain has 5 stores or more) adopt a pattern of competition based mainly on advertising and product promotions, while independent supermarkets (fewer than 5 stores) compete mainly in service and price. The independents face an important mobility barrier (Caves and Porter, 1977) and earn lower margins, but they are a real option as a distribution channel.

Interestingly in the context of continued consolidation, the independents gained ground recently. Table 2 shows their food retail market share increasing from 40% to 44% while the chains' share stagnated at 45-43%. The independents have concentrated on rural towns or areas in cities where the chains have not yet located; or if they are established where the chains have located, they have competed with them in prices. They have also gained because, as Farina and Nunes (2002) have recently discovered, large food manufacturers and wholesalers have tried increasingly to supply them in order to improve their average return to keep them in business as an alternative buyer to the large chains, reducing the latter's buying power (the manufacturers' equivalent of the supermarkets' use of private retail labels to control the suppliers' power).

Table 2: Food retailing by type of store, 1994-2000

	% No. of stores						
Year	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Traditionals	85.0	84.5	84.5	84.8	84.4	82.1	82.3
Supermarkets	13.5	14.4	14.1	13.9	14.3	16.7	16.6
Independent supermarkets chains	1.5	1.5	1.4	1.3	1.3	1.2	1.1
% 10 largest in chain	15.95	15.00	14.74	16.60	18.85	24.92	31.75
	No. of stores						
Traditionals	211965	227603	238671	257607	257822	262348	269438
Independents	33808	37933	39802	42121	43825	53196	54218
Chains	3735	3907	3961	3954	3888	3884	3536
10 largest	596	586	584	656	733	968	1123
Total Brazil	249508	269443	282435	303673	305534	319428	327192
	% of food sales						
Traditionals	14.9	15.3	15.6	15.4	15.6	13.7	13.2
Chains	45.1	44.4	44.6	44.9	46.6	44.7	42.8
Independents	40.0	40.3	39.8	39.7	37.8	41.6	44.0

Source: AC Nielsen – 1993/1994 to 1999/2000 (www.abrasnet.com.br).

Focus on food retailing: supermarkets versus other retailers

Supermarkets and hypermarkets play a crucial role in food retailing. Table 2 shows that they are by far the dominant (75% of sales) food retailer in Brazil. With 86% of all food retail sold via self-service stores (as opposed to full-service, traditional shops and street fairs), convenience stores (including the alternative greengrocers discussed below) account for 11% of food retailing (Brazilian Food Processors Association), and traditional shops and open-air street markets (*feira livres*, discussed below), for the rest.

The increasing role of supermarkets in specific product categories is shown in Tables 3 and 4. Even for products traditionally bought in open-air markets, such as fresh fruit and vegetables (FFV), or in bakeries, such as fluid milk (Table 4), supermarkets

Table 3: Consumer purchase locations of FFVs (%), Metropolitan areas

	Belo Horizonte		Rio de Janeiro		São Paulo		Brazil	Brazil variation 95/96/86/87
Grocery shop	3.13	(7.41)	9.87	1.90	7.53	(0.50)	14.45	0.84
Green grocery	1.72	(0.33)	0.60	(0.11)	14.33	13.05	4.58	5.28
Street market	6.10	(7.45)	22.48	(17.89)	42.52	(22.22)	22.14)	(19.81)
Super-market	12.68	(5.62)	34.76	(9.33)	22.96	5.23	37.20	2.95
AGG	72.30	71.72	28.95	28.93	10.16	10.17	16.30	18.45

Note: The first column under each pair of columns per city shows the share of consumer purchases of FFVs from that type of retailer. The second column indicates the decline (in parentheses) or the increase in the share over the period 1986/7 to 1995/6.
Source: *Family Budget Survey*, Brazilian Institute of Geography and Statistics (IBGE), 1986/7; 1996/6.

Table 4: Consumer purchase locations of pasteurised and UHT milk and dairy products (%), Metropolitan areas

	Milk			Dairy products		
	1986/7	1995/6	% variation	1986/7	1995/6	% variation
Grocery shops	11.9	11.1	-7.2	10.7	11.6	8.7
Dairy stores	68.7	53.3	-22.3	40.4	29.2	-27.8
Open-air market				1.0	0.5	-53.3
Supermarket	15.0	28.5	89.4	42.1	50.0	18.8
Vendors	2.6	3.5	34.3	3.1	4.1	32.2
Others	1.8	3.7	105.0	2.7	4.6	70.0

Source: *Ibid.*

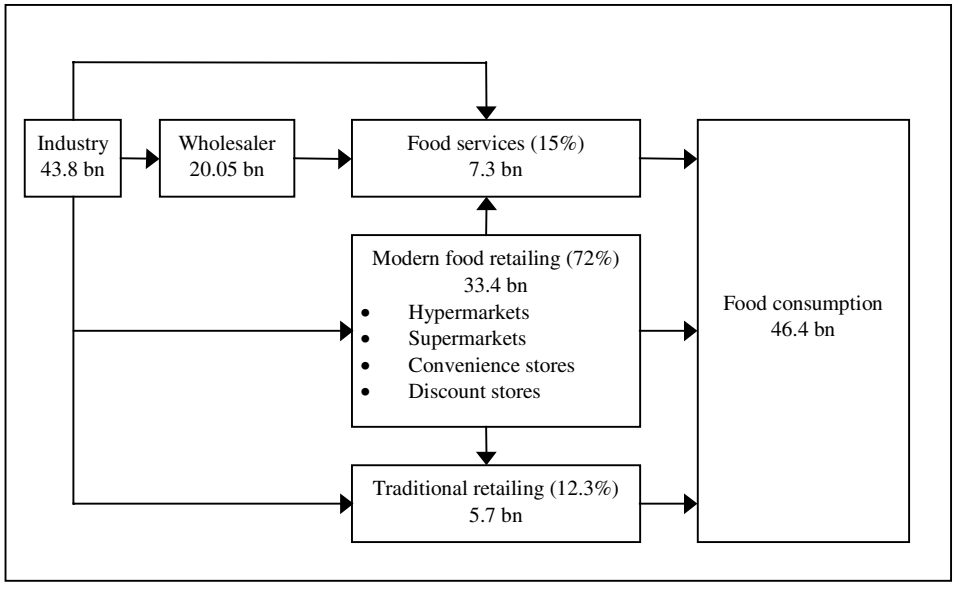
have become increasingly important; they now have 50% of FFV retail (Belik, 2000). In São Paulo, the largest consumer market, the share is lower (30%), due to the persistent decline in importance of street markets; in that city 50% of dairy products are sold in supermarkets.

Note, however, that after reaching a peak of 85% of food retailing in 1993/4 (following a decade of growth when supermarkets gained dominance over traditional shops), their share has not grown, and traditional shops regained some of their former position. 'Traditional' is somewhat of a misnomer in this case, however, as many small stores are involved in niche retailing – with an increasing number of fine-food *boutiques*. There are thus two segments of the traditional stores: the majority aimed at the poorer consumer segment in their local neighbourhood, with cheap products of medium to low quality, and the other segment of fine-food *boutiques* based on specialities and high quality products.

Prepared food retailing: fast-food chains and kilo restaurants

Figure 1 shows, that in addition to food purchased from retailers, there are important expenditures (15%) in the food service sector, including fast-food chains, traditional restaurants, and a Brazilian passion: kilo restaurants (self-service restaurants with a buffet of cold and hot dishes which the customer pays for by weight at a fixed price per kg.).

Figure 1: Brazil – Food distribution and sales, 1999 (US$)



Source: AC Nielsen (2000), www.abrasnet.com.br.

Many international fast-food companies joined McDonald's in Brazil in the 1990s: Subway, Arby's, KFC, and Pizza Hut, among others. However, only McDonald's has

succeeded. Market restrictions partly explain the failures: in addition to some taste barriers, the restaurants faced difficulties in managing the supply chain to obtain highly standardised ingredients and delivery services at competitive prices. Moreover, the creation and rapid growth of kilo restaurants, which compete directly with them, has represented a real threat and is one of the causes of the failure of international fast-food franchises, especially those oriented to the adult public. 'Kilo restaurants' are also fast, cheap, do not require rigidly standardised ingredients, and have the additional advantage of being adapted to Brazilian habits and tastes. In other words, they cater to consumer requirements and are easier to manage.

However, the growth of the franchising system is a strong trend, permitting the rapid growth of a chain and allowing local entrepreneurs to benefit from technical, managerial, and brand-name assistance. From 1995 to 1999 the number of food franchising chains grew by 6%, but the number of stores grew by 48% and employment by 15%. Today, the food service segment is responsible for 21% of the franchising chains, 94% of which are Brazilian companies. Because the franchising system requires rigid standards of products and services, a lot of effort has been put into improving suppliers to guarantee a stable standard of quality and competitive prices. McDonald's is, of course, the benchmark.

Food processing

The processing industry is less concentrated than the modern retail segment and the concentration level has not grown since 1994. Table 5 shows that the concentration ratio for the ten largest companies is now 26%. However, mergers and acquisitions have increased and changed the competitive environment. Among the top 10, 8 are

Table 5: Food industry concentration ratio CR_{10} (10 largest companies' gross revenue/total food industry revenue)

1994		1996		1999		2000	
Nestlé[a]	5.42	Nestlé[a]	5.25	Nestlé[a]	6.04	Nestlé[a]	5.45
Copersucar	5.00	Copersucar	3.22	Ceval[a]	4.03	Bunge[a]	5.20
Ceval	3.53	Ceval	2.70	Sadia	4.03	Sadia	3.69
Santista[a]	3.28	Santista[a]	2.45	Cargill[a]	3.91	Cargill[a]	3.52
Sadia	2.89	Sadia	2.38	Perdigão	2.49	Perdigão	2.20
Frigobrás	1.68	Cargill[a]	1.92	Parmalat[a]	1.98	RMB[a]	1.68
RMB[a]	1.68	Perdigão	1.49	Santista[a]	1.98	Parmalat[a]	1.55
Perdigão	1.62	Parmalat[a]	1.47	Kraft Lacta[a]	1.33	Kraft Lacta[a]	1.09
Yolat[a]	1.51	Sadia Frigobrás	1.43	Arisco[a]	1.31	Fleishmann[a]	1.08
Cargill[a]	1.50	RMB[a]	1.29	Nabisco[a]	1.21	Aurora	0.87
Total (CR_{10})	28.08	Total	23.60	Total	28.28	Total	26.32

Note: a) Multinational.
Source: Editora Abril (1995, 1997, 2000, 2001) and Brazilian Food Industry Association (www.abia.com.br).

multinationals. Jank et al. (1999b) discuss this recent wave of mergers and acquisitions, resulting in the multinationalisation of the Brazilian food industry.

As in the retail sector, stiff competition has led to price and cost competition, market segmentation, and product differentiation, the upshot being that since 1994 food prices have declined by 30% on average, and processed food prices by 40%. The number of new processed products has grown: average yearly product releases jumped by more than 200% from 1995/1997 to 1997/2000, as reported by the Brazilian Food Industry Association (ABIA).

General effects on processors and farmers

First, even for large food manufacturers/processing companies such as Nestlé, Unilever, Sadia, and Bunge, the bargaining power of the largest retailers has changed buyer-seller relationships and tightened suppliers' margins. However, processing companies cannot afford to have their products off retail shelves because of the crucial role of supermarkets in food retailing.

Second, supermarkets, food-service chains, and large processors demand and, because of their buying power, can require relatively high standards of quality and safety in the raw materials they buy from farmers. These requirements are reflected in stringent private grades and standards. For example, food-service franchises, especially the international chains such as McDonald's, are very demanding (much more so even than supermarkets) in terms of food safety and other quality attributes. They require from their suppliers control of water quality, seeds variety, pesticides, packaging, and temperature, along with rigid standards of size, colour, and texture.

Third, retailers have changed their purchase systems as they have consolidated. Together with the processing industry, they have adopted new procurement cum logistics systems (such as distribution centres with modern logistics platforms, see below), have drastically reduced the number of employees, have redefined the scope of operations focusing on core business activities, and have implemented quality control processes, which, in many cases, required the commitment of suppliers, including farmers. Upstream impacts were not limited to reduction in the number of suppliers and the absolute exclusion of producers, but also involved changes in the relationships between buyers and suppliers.

Among the main changes introduced by the larger retailers, multinational or domestic, is the use of huge distribution centres as focal points for product procurement – first introduced for non-perishable items, then extended into produce procurement, and now used for refrigerated items as well. As discussed below, private distribution centres have replaced the important role played by the big state-owned Entrepôts and Storage Companies (CEASAs) in the case of fresh vegetables. For processed food the impact is much smaller, except for the influence of the centralisation of procurement on prices and sales conditions. As stated by a Brazilian wheat flour producer, 'we live in the supermarket dictatorship era!' (Lawrence Pih, president of Pacífico Mill, 2002). The consolidation of procurement means that the capacity of farmers and processors to meet the large retailers' requirements (cost, volume, quality, safety, delivery timing, packing or packaging) will increasingly determine whether they stay in the market. The implications of this at a regional level are explored in Belik and dos Santos (this volume).

Finally, it is important to focus not just on the consolidation itself as an explanatory factor but also on the competition that leads to and follows consolidation – and the specific competitive strategies that firms adopt. Institutional changes such as deregulation of prices, the imposition of new public and private standards, trade liberalisation, and tougher environmental and consumer protection by the government have created a new environment where efficiency and innovation become the most important instruments of competition for retailers, processors, and farmers. The intensification of competition, started in the early 1990s, created the basis for further consolidation cum multinationalisation that has gained momentum since 1994/5; the processes are mutually reinforcing – competition leads to consolidation which leads to more intense competition.

The fresh vegetables case is an excellent example of the adoption of new regulating structures in a chain and the implications for small producers, although we do not have adequate data to analyse the exclusion dimension of the changes with precision. The dairy system case shows more precisely the impact on numbers of suppliers, although it is not as rich in the variety of regulating structures adopted.

Fresh fruit and vegetables chain

Throughout the world, the organisation of the fresh fruit and vegetable (FFV) chains has undergone profound change in the past decade. The three main changes include: shifts towards products such as 'fresh cuts' that incorporate services to facilitate food preparation, and towards new production, transport, and storage technologies that reduce seasonality and expand markets geographically; and the growth of large buyers, especially modern retailing chains (OECD, 1997). The Brazilian produce sector has experienced all three sets of changes.

The Brazilian pattern of FFV consumption is very uneven: only 44% of the urban population consume fruit and 58% consume vegetables. Almost 70% of total demand is concentrated in the three largest cities, São Paulo, Rio de Janeiro, and Belo Horizonte, due to incomes and consumer habits (*Household Expenditures Survey*, 1995/96, www.ibge.gov.br).

FFV retail and wholesale systems

Supermarkets are the main FFV retailers in most metropolitan areas, except in São Paulo and Belo Horizonte. In São Paulo, street fairs or open-air markets, and in Belo Horizonte, alternative green groceries (AGG),[1] are the leading FFV retailers (see Table 3). São Paulo has a historical tradition of *feiras livres*. Belo Horizonte has a strong public policy promoting AGGs for social objectives. However, the *feira livre* is losing share very fast (its total volume of sales has dropped by 22% since 1987) to

1. The AGGs include three types of retail stores, all aimed at poorer consumers: 'varejões' (large retailers), groups of several stores specialising in the sale of FFV, at a low price, in one place; 'sacolões' ('big bags'), shops where FFV are sold by the kilo at a single price based on the average of wholesale prices; these were originally created as a social programme to foster the consumption of FFV by the lower-income population; 'comboios', mini-'varejões' with only a small store for each type of product. The AGGs offer low prices for poorer consumers, non-standard products, and very few services or presentational 'frills' (compared with supermarkets).

supermarkets and AGGs in São Paulo, while Rio de Janeiro and Belo Horizonte are increasingly dominated by AGGs (IBGE, *Family Budget Survey*, 1986/7 and 1995/6).

The FFV section has become a factor of differentiation and marginal recovery for supermarkets; the former ugly duckling has become a swan. Some large Brazilian supermarket chains such as Pão de Açúcar and some multinational chains have achieved a 23% margin on FFV sales, though the target is 30% (a strong average non-FFV item return might be 10-15%). This means that supermarkets are paying close attention to being competitive in costs and quality, and thus to their wholesale procurement systems. This is giving rise to a change in the FFV wholesale system, as discussed below.

The traditional FFV wholesale system was put in place in the 1960s by the government's creation of the CEASAs (the State Entrepot and Storage Centres – wholesale markets cum distribution centres managed by the government). The aim was to provide a public structure where the private marketing of FFV could occur in a competitive market, with transparency and free access for farmers. At the time of the creation of the CEASAs, a diagnosis of FFV market flows indicated that private investment in distribution centres would be sub-optimal because of network economies and externalities.

The CEASA system is still dominant in the FFV wholesale system. The São Paulo CEASA is the largest (4,075 wholesalers sell US$4.5 million of FFV per year, and 50,000 people and 10,000 trucks move through it every day). While the number of wholesalers is large, the sales are highly concentrated, and a handful of wholesalers per product type have a dominant position in the determination of prices.

Nevertheless, the CEASAs are losing their market share very rapidly; the volume and value sold by the São Paulo CEASA dropped by 11% and 21% (the second rate is greater than the first due to a fast drop in FFV prices over the period), respectively, from 1995 to 2000. While AGGs, *feira livres*, and independent supermarkets (which lack alternative sourcing systems) still rely on the CEASAs, the large retail chains are turning away from them for their produce procurement and towards alternative systems. This is because they want to skirt the wholesalers (in particular the oligopolistic set and their price-setting market power in the CEASAs). Moreover, supermarkets cannot set and enforce private standards of quality and safety for the FFV they buy in the CEASAs, and the public standards are spotty and not implemented. Supermarket chains need standard quality of produce (appearance, size, colour, crates/pallets) for efficient inventory replenishment and standard pricing in their stores.

The large chains have developed alternative FFV procurement systems. (i) They have tried to make formal or informal agreements with wholesalers to avoid storage (Farina and Machado, 2000). Unfortunately, the experiment has failed, as revealed in recent interviews with leading supermarket chains and wholesalers (Farina and Nunes, 2002). (ii) They have developed formal and informal contracts with growers, and with processors such as fresh-cuts firms, most of which, in turn, have contracts with growers. The supermarket chain makes partial payment up-front to growers under contract, provides cleaned boxes, and obtains guarantees of supply (Farina and Machado, 2000). This type of strategy represents a very small proportion of the fresh vegetables sold by supermarkets, such as leafy greens. Most are bought on a price basis with very few requirements as to physical attributes, allowing price formation and control. (iii) A growing trend is towards use of their own distribution centres. Both (ii) and (iii) allow them to cut procurement costs by adapting their logistics platforms to the contracted or

expected supply and to work with larger volumes in centralised locations, and also to impose private standards of quality and safety, with price incentives to farmers for quality.

An example of a large chain combining (i) and (ii) is the case of Carrefour. It has invested in its own distribution centres; in 2001 it entered a joint venture with the joint venture Cotia Trading (Brazil)-Penske Logistics (US) for a distribution centre in São Paulo across three Brazilian states, serving 50 stores in the Southeast Region. Moreover, it contracts directly with some growers for some products in order to guarantee quality standards (shown by the Carrefour Quality Certificate), paying premium prices and requiring stricter quality standards, including restrictions on quality of water, seeds, pesticides, and post-harvest practices.

Fast-food companies have also adopted the new co-ordination mechanisms. Franchising chains impose strict standards of business and quality control on their suppliers, and are under logistical pressure because they are situated in densely populated areas and thus have little room for storage. Fast-food companies cannot receive, clean, cut, and prepare produce within the store and must be supplied according to a very strict timetable by fresh-cuts (minimally processed fruit and vegetables) companies.

Initially (in the 1980s) they had a hard time obtaining a guaranteed steady, timely, high-quality supply of produce in the needed volumes, and they undertook backward integration as well as building distribution centres, which was not then common in the produce chain. The vertical integration proved inefficient and cumbersome, and the unmet demand led to the formation of fresh-cuts companies similar to those that arose at roughly the same time in North America and Europe, which prepare fresh cuts to be delivered and used by fast-food restaurants. The requirements are very strict in terms of both timetable and quality. In this case, quality involves physical and microbiological requirements, which are stricter than the Brazilian regulations on vegetables. As a consequence, the supply companies have had to invest in highly specific assets to fulfil these requirements. Fast-food restaurants demand daily microbiological control and audit the fresh-cut companies monthly. The contractual relationship is formal but, above all, is based on the fact that the fresh-cut companies have made investments specific to the needs of the fast-food firms. The restaurants depend on the prompt delivery by suppliers and the latter's return on dedicated investment capital depends on the continuity of transactions. Some fresh-cut companies also supply supermarket chains with high quality produce, as they offer pre-packed, ready-to-eat salads whose shelf life depends on the quality of the produce and the application of advanced technology in handling, packing, and transportation.

The most important limit to the companies' growth is not market demand but the supply of high quality vegetables. Traditional growers have a strong resistance to new technology and quality standards, which has led the companies to formally contract selected growers (as revealed in interviews with fresh-cut companies in the São Paulo area). Backward integration (where the fresh-cut company actually produces its own vegetables) has produced bad results, however, and was rapidly abandoned in favour of contracts. In contrast, some fresh-cut companies have exclusive contracts with fast-food chains, with a strong commitment on both sides to honour their agreements. The reputation mechanism has thus been one of the most important long-standing requirements for ensuring that contracts are honoured.

Impact of these changes on farmers

In the case of both supermarkets and fast-food companies, the new commercial practices and the quality and safety standards that are applied, require substantial investments in physical, financial, and human capital on the part of FFV producers. These include changes in post-harvest practices and thus investment in improvements in the cold chain and transport, as well in production practices, with investment in drip irrigation, hygiene facilities in the fields, and greenhouses. These substantial investments are difficult for small farmers to make. The result is the increasing differentiation of farmers, most of whom will continue to depend on intermediaries and distribution centres. It is not yet clear whether a large number of small farmers have been excluded, because Brazilian statistics are very poor.

The other side of the coin is that the changes in procurement practices undertaken by supermarkets, fast-food chains and fresh-cut companies have created new opportunities. On the one hand, new opportunities are being created for farmers in the domestic market as the supermarkets emphasise produce quality and product differentiation (for example, into organics and fresh-cuts). The most profitable options, however, require management skills and education.

On the other hand, the national and global sourcing by some supermarkets creates scaling-up opportunities for growers with the capacity to respond. For example, the *Gazeta Mercantil* (20 December 1999; as cited in Lopes and Perez, 2000) notes that Carrefour made a deal starting in January 2001 with three melon exporters in Northeast Brazil to supply both its (at that time) 67 stores in Brazil and outlets in 21 other countries where it operates. The product received the Carrefour Quality Certificate, which allows it to enter the procurement network anywhere Carrefour operates.

Effects on the dairy chain

Processing consolidation and multinationalisation, and the supermarket cost squeeze

Brazilian dairy processing underwent consolidation and rapid multinationalisation from the early 1980s through the 1990s. This was similar to what happened in retailing but the industry was already relatively concentrated in the early 1980s. Over the same period the market boomed. In 1981, sales of the 20 largest processors amounted to US$2.285 billion, compared with $8.406 billion in 1996. In 1981, the top three (Nestlé, based in Switzerland, and the largest food manufacturer in the world, plus two domestic firms) had 52% of the market, and the top two, Nestlé plus a domestic firm, 43%. In 1996, the top three (Nestlé, and Parmalat, based in Italy, plus a domestic firm) had 61% of the market; and just Nestlé and Parmalat 53%. While Parmalat had only one-third the sales of Nestlé in 1996 in Brazil, it had entered Brazil only in 1988 but by 1994 had 11% and by 1996 13% of the market. Its meteoric rise was due to the acquisition of two dozen domestic firms between 1988 and 1997 (Jank et al., 1999a). After this rapid concentration, there was a slight de-concentration (unlikely to be a strong reversal of the consolidation trend) up to 2000, as the CR_{12} fell from 52.6% to 48% of inspected milk processed (see Table 6).

Table 6 shows clearly that Nestlé and Parmalat dominate and drive the dairy sector. Five of the 12 firms in the table are multinationals; two are domestic firms in joint ventures with multinationals: Batavia, a former 'central co-operative', 51% owned by Parmalat, and Vigor, a Brazilian family-owned firm, in partnership with MD Foods, a Danish dairy company, for cheese production.

Before the 1990s, most of the main processing firms were strong central co-operatives (in order to capture economies of scale in processing, they collect from local co-operatives that collect milk from farmers and cool it) producing cheese, powdered milk, UHT milk, and so on. Deregulation of the dairy market occurred from 1989 to 1993; retail and farm prices were freed. This brought a sharp increase in competition as firms then began competing vigorously in price and cost cutting. However, the central co-operatives could not meet the new competition, in particular the entry of the multinationals, and most of them struggled financially. The stabilisation policy plus the rise of supermarkets intensified the competition in the mid-1990s.

The result was that the regional and central co-ops were sold to the multinational companies listed in Table 6. Among the 12 largest companies, only Itambé, the third in volume of milk processed, is still a strong central co-operative. Paulista (still number 3 in 1996) has recently sold its brand name and some processing plants to the French Danone.

The new investments, deregulation, and new entries drove down prices (the relative prices of dairy products have dropped by 35% since 1994), and brought product differentiation and market segmentation. Supermarkets, in price competition with each other, passed on the lower milk prices to consumers. Consumer prices are lower compared with six years ago, while from 1997 to 2000 milk production and processing have increased by 2.5% a year in volume. This suggests that the production and efficiency gains throughout the dairy system have been passed on to the urban sector.

Moreover, the extremely rapid rise of UHT milk introduced an important new factor that increased competition and the importance of volume sales to supermarkets. Parmalat's introduction of UHT milk in the late 1980s and its outstanding growth (especially after 1992) caused this product to take over the fluid milk market. Tetrapak's (Sweden) aggressive strategy of sales all over the country of vacuum-packing equipment for UHT milk, along with an equally aggressive promotion of UHT milk by Parmalat, led to a rapid substitution of UHT for pasteurised milk: from 5% of the fluid milk formal-sector market (60% of all fluid milk nationally and around 85% in large urban areas) to 75% in 2001 (Associacão dos Produtores de Leite B, Associacão dos Produtores de Leite Longa Vida, and the Instituto Brasileiro de Geografia e Estatistica). UHT real prices have declined more than 40% since 1994.

The consequences of this substitution are important. Most UHT milk is sold in supermarkets, while pasteurised milk used to be sold by bakeries. This means that milk retail has shifted rapidly into supermarkets, whose relentless quest for cost-cutting was passed on to the dairy processors. Private standards were instituted by the leading processors to reduce costs by raising efficiency and providing incentives for investments by farmers. They required milk cooling at the farm level which reduces procurement costs and improves the quality of the raw material. The managerial and technological implications of the private standards for farmers were amazing (see below).

Table 6: 12 Largest Brazilian dairy companies by milk processed

Companies	Annual milk reception (litres m.)				No. of milk suppliers				Production per day (litres/day/farmer)			
	1997	1998	1999	2000	1997	1998	1999	2000	1997	1998	1999	2000
Nestlé[a]	1413	1358	1336	1393	35089	28920	22512	14142	110	129	163	270
Parmalat[a]	857	814	773	919	21040	16052	14302	15550	112	139	148	162
Itambé (co-op)	730	753	797	773	18250	15369	12690	8400	110	134	172	252
Elegê (Doux)[a]	607	603	660	760	38537	34402	34402	32188	43	48	53	65
Paulista (co-op)	673	626	419	513	24481	22162	15154	8925	75	77	76	157
Batavia (Parmalat)[b]	273	274	297	273	1125	1093	7772	7505	67	72	105	100
Vigor Group (MD Foods)[b]	295	288	231	230	8142	6442	4823	3693	99	122	131	170
Leite Líder	141	165	192	207	5880	6930	8650	8795	66	65	61	64
Centroleite	132	151	141	175	3180	3355	3335	4205	114	123	116	114
Latricínios Morrinhos	105	121	153	146	4300	4250	6677	7292	67	78	63	55
Fleischmann Royal[a]	166	184	185	140	4000	3000	2640	2335	114	168	192	164
Danone[a]	167	144	120	130	1426	1180	995	1420	321	335	330	251
Total	5560	5480	5303	5659	175450	152455	133952	114450	87	98	108	135
CR_{12} – Formal market (%)	52.6	50.1	47.9	48.0								
CR_{12} – Total market (%)	29.8	29.3	27.8	29.3								

Notes: a) Multinational companies; b) multinational participation in capital.
Source: www.terraviva.com.br.

Impacts on dairy farms

The above changes led to upheaval in the distribution of dairy production in Brazil in only a decade. First, they affected the regional distribution of milk production. UHT milk has broken regional barriers and production patterns as it can be transported long distances at low cost (no necessity to transport in refrigerated trucks, as for pasteurised milk). Poor quality and lack of controls led to pasteurised milk lasting about three days, making inter-regional commerce difficult. UHT milk, by contrast, has a shelf life of 3-6 months. UHT milk from Rio Grande Do Sul, Paraná, and Goiás states and even from Uruguay and Argentina is sold in São Paulo (the largest milk market) at competitive prices with milk produced in São Paulo. This trend was intensified by the regional and national sourcing systems of the large supermarket chains, such as the Carrefour distribution centre discussed above.

All this caused a rapid integration of Brazilian milk markets and increasing competition pressures. As a consequence, there has been a concentration of milk production in new regions with shipment all over the country, contributing to the demise of the traditional and less competitive regions, in particular of São Paulo and Minas Gerais, which had high production because of the natural environment, but also the large markets of São Paulo, Belo Horizonte and Rio de Janeiro. These regions now have higher costs due to competition for land (from urban growth as well sugar and oranges) and from industry for labour. Companies, including co-operatives, built their UHT processing plants in the centre west such as the Goias state to enjoy lower costs and now have to compete in a national and regional market.

Second, there has been an effect on the producer co-operatives. As noted above, the central co-operatives used to dominate the pasteurised milk segment, and they have been the most affected by these changes. All co-operatives currently produce UHT, even very small ones with scale disadvantages. However, the pasteurised milk was mainly sold by co-ops that were protected from competition because, with pasteurised milk being more perishable and requiring cooling storage and transportation, they were able to dominate their local catchment area. Nestlé and Danone have never sold pasteurised milk.

Third, there were inter-farm distribution effects. Tough price competition has led to the adoption of new chain management strategies by processors. Reacting to the pressures of lower margins, leading processors required the adoption of refrigeration tanks at farm level, which requires a minimum scale of operations. Moreover, in order to take full advantage of this technology, the producer is stimulated to undertake a second milking, followed by mechanical milking, and improvements in genetics. To take full advantage of the refrigeration system, the farmer has to invest in herd and milking equipment, and the technological upgrade requires a managerial upgrade. Hence, the investments that arise from the cooling requirement are multiple.

In Brazil, the smallest tank holds 200 litres, requiring production of at least 100 litres a day. But average farm production is 50 litres a day, and most farms cannot manage the new system. Table 7 shows the distribution of dairy farms in Brazil in the latest census (1995); only 5.3% of dairy farmers had output/day of 100 litres or more, implying a massive exclusion of small dairy farmers from this technology.

Table 7: Dairy farmer milk production distribution, 1995-6 (%)

Region	Up to 50 l/day		> 50 < 100 l/day		> 100 < 200 l/day		> 200 l/day	
	a	b	a	b	a	b	a	b
Northern	90.9	54.3	6.4	22.7	2.1	14.3	0.6	8.7
Northeastern	95.9	53.8	2.5	15.0	1.1	17.7	0.5	13.5
Southeastern	73.1	21.1	13.3	17.0	8.2	20.6	5.4	41.3
Southern	92.9	57.1	4.8	17.7	1.6	11.8	0.7	13.4
Centre-west	72.6	28.2	15.8	23.6	8.2	23.7	3.4	24.5
Brazil	87.7	36.1	7.0	18.2	3.5	17.8	1.8	27.9

Notes: a) Producers; b) production.
Source: Brazilian Institute of Geography and Statistics, *Censo Agropecuário*, 1995.

This is in fact what was observed. During the period 1997-2000, the number of farmers delivering milk to the top 12 companies dropped by 60,000 (35% of suppliers) and there was a 55% increase in their average size (litres/day/farm) (see Table 6). Nestlé alone shed 20,000 farmers from its supply lists – a drop of 49% – and the average scale of a supplier has increased by 135%. This phenomenon is not confined to private companies and multinationals. Itambé, the largest Brazilian dairy co-operative, has reduced its number of producers (by voluntary and forced exit) by more than 46%, while the average scale has grown by 130%. Total milk collected has grown by 9%. In fact, milk volumes did not fall, but rather there was a slight increase (+1.7%) in total milk processed by the top 12 firms. Some larger farms gained significantly from the process. Table 6 shows that since 1997 the leading dairy companies have received more milk (17%) from a smaller number of larger producers.

The excluded small farmers moved to smaller processors, or to the informal sector, or went out of business. The small processors were themselves quickly going out of business, and the rapid rise of the supermarkets (combined with the meteoric rise in UHT) was reducing the informal milk market – and thus the options for small farmers. The next census in 2005 will tell the full story of the decline in the small dairy farm sector.

However, the smaller farmers have gone in for collective tanks to meet the scale requirement, though the larger farmers will keep their advantage since they do not face the transaction costs involved in the collective use of physical assets (Jank et al., 1999a). Dairy companies and co-operatives have encouraged the use of collective tanks, especially in regions where the average dairy farm is smaller, such as in the centre west. They have also financed or facilitated credit for milk producers. The Brazilian National Development Bank offers a special line of credit at favourable interest rates to the 'pro-leite' programme. Large processors act as intermediate agents in the distribution of this credit to the farmers. However, the leading processors interviewed by the author report a diminishing number of these collective tanks because of conflicts among the farmers and the higher costs of managing these systems.

Fifth, the excluded farmers are not confined to small producers. The beef/milk producers or the beef producers who sell milk during the high season will also tend to disappear. Moreover, investment in milk refrigeration is specialised. The farmer therefore tends to become not only more efficient but also more sensitive to price variations. Refrigeration leads to other investments in milk production that are valuable

only if milk and not beef is produced. It is thus worthwhile to invest only if there is specialisation, and this implies that the farmer will lose the flexibility to send his cows to slaughter when milk prices are low and also that he will have more cash expenses (and not only opportunity costs). Nowadays, many farmers do not hire workers but use family labour.

Moreover, this threatening competitive environment has led many large dairy farmers from the most traditional regions to change their business as well. Highly specialised cattle herds have been auctioned and transferred to other regions that have increased their share in the country's milk supply.

The government is currently formulating and negotiating new legislation to regulate safety in dairy products, as part of a wider 'Milk Quality Improvement Programme'. The legislation is expected to make current private standards public, requiring refrigeration at farm level and refrigerated transport systems. This will generalise and accelerate the trends noted above. The current quality/safety levels for pasteurised milk will be replaced by two types of milk: for consumption in fluid form (pasteurised or UHT) or in processed form (cheese, powdered milk, yoghurt). New quality/safety tests will also be mandatory for processors, and will allow them to impose discounts or give price incentives to producers for quality.

Conclusion

Three interlinked forces – consolidation, multinationalisation, and increased competition – have marked Brazilian food retailing (with the rapid rise of supermarkets), services, and processing over the past decade since liberalisation. Competition has occurred not only in the traditional realm of prices and costs, but also in quality and service and product differentiation. This has driven organisational change in the system, such as the supermarkets' shifting from FFV procurement in the traditional wholesale markets towards own distribution centres and direct contracts with growers. It has also led to institutional change: the imposition by supermarkets and processors, such as large dairy products firms or fresh-cut companies supplying fast-food chains and supermarkets, of demanding private standards (imposed via contracts). These institutional and organisational changes were undertaken to better co-ordinate the supply chain, cutting costs and improving quality in order to compete more efficiently.

The strong competition and the strategic changes it produced led to the adoption of new technologies – in processing, in retail logistics, in distribution, in farming, as illustrated in the cases of FFV and dairy products. For instance, to meet the large processors' quality and volume requirements, dairy farmers needed to invest in first-class cold chains and large cooling tanks. Few farmers could afford this and there has therefore been a rapid reduction in the number of small farmers selling milk to large processors. They saw their options drying up as the informal market shrank with the takeover of the milk market (spurred by the new processing and packaging technologies, UHT and Tetrapak) by the supermarkets. Collective tanks turned out only to postpone this exclusion and exit as they were not as efficient (in logistics, traceability, group contracting) and managerially practicable as the larger tank system.

The main consequence for small farmers is an increasing need for better access to capital and education. Management capacity is almost as important as physical capital, and this is the most difficult thing to provide in Brazilian conditions. Collective action

to deal with scale requirements is needed. However, collective action has to be designed to satisfy new product and process standards or to avoid exclusion from the new supply technology and distribution management, such as Efficient Consumer Response or electronic data exchange. Collective action through co-operatives or associations is important not only to be able to buy and sell at a better price, but is also vital to help smaller farmers adapt to new patterns – and much greater levels – of competition.

References

AC Nielsen (2000) 'Tendencias. supermercados: El self-service al comienzo del milenio', Informe Especial, SuperNet SA, Buenos Aires, June.

Caves, R. E. and Porter, M. E. (1977) 'From Entry Barriers to Mobility Barriers: Conjectual Decisions and Contrived Deterrence to New Competition', *Quarterly Journal of Economics* 91: 241-61.

Belik, W. (2000). 'Mecanismos de coordenação na distribuição de alimentos no Brasil,' in W. Belik and R. S. Maluf (eds), *Abastecimento e segurança alimentar: Os limites da liberalização*. Campinas: Universidade de Campinas.

Editora Abril (1995) *Exame Melhores e Maiores* 22, August: 122-8.

Editora Abril (1997) *Exame Melhores e Maiores* 24, July: 120-3.

Editora Abril (2000) *Exame Melhores e Maiores* 27, June: 154-6.

Editora Abril (2001) *Exame Melhores e Maiores* 28, July: 156-8.

Farina, E. M. M. Q. (1999) 'Issues and Challenges for the Mercosur Food Industry in the Context Of Agroindustrialization and Globalization,' *International Food and Agribusiness Management Review* 2 (3/4): 315-30.

Farina, E. M. M. Q. and Machado, E. (2000) 'Brazilian Fresh Fruit and Vegetable Chain Coordination', *Proceedings of the V Chain Management Conference*, Wageningen, The Netherlands: 83-192.

Farina, E. M. M. Q. and Nunes, R. (2002) *A evolução do sistema agro-alimentar no Brasil E A redução de preços para o consumidor: Os efeitos da atuação dos grandes compradores*. Research Report. Santiago and São Paulo: Economic Commission for Latin America and University of São Paulo.

Jank, M. S., Farina, E. M. M. Q. and Galan, V. (1999a) *O agribusiness do leite no Brasil*. São Paulo: Editorial Milkbiz.

Jank, M. S., Leme, M. F. P., Nassar, A. M. and Faveret-Filho, P. (1999b) 'Concentration and Internationalisation of Brazilian AgribusIness Exporters', *International Food and Agribusiness Management Review* 2 (3/4): 359-74.

Lopes, W.C. and Perez, L.C. (2000) 'Current Aspects of Food Retailing within Brazil at at the International Level', São Paulo: BNDES (mimeo).

OECD (1997) 'Vertical Coordination in the Fruit and Vegetable Sector: Implications for Existing Market Institutions and Policy Instruments' (mimeo).