



## Private and public milk standards in Argentina and Brazil

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### Abstract

This article focuses on the development of public and private standards for milk as an input to the dairy processing sector in Argentina and Brazil. From 1950 to 1990, the dominant trend was the development of public standards for basic safety and hygiene of milk. These induced the incipient modernization of dairy farming, post harvest, and processing technologies, even though implementation of the regulations was only partial. The dairy sectors were liberalized and privatized circa 1990. This spurred the rapid rise of private standards set by large processors over the 1990s and into the 2000s. These standards are much more stringent than public standards, and induced rapid concentration at the processing and farm levels due to stiff investment requirements. In Brazil, private standards were set mainly to drive down costs in the supply chain in order to reduce the consumer prices in the mass commodities market. In Argentina, private standards were used to develop quality differentiation in the product market. In both countries, in the 2000s a debate has emerged on new roles and approaches for public standards. © 2005 Published by Elsevier Ltd.

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## **Introduction**

This paper focuses on the evolution in Argentina and Brazil of public and private quality standards for milk, in the context of the marketing and production strategies of large dairy products firms, and the possible impacts of this evolution on dairy product supply chains and their actors. Increasingly, food quality is becoming a key attribute in the transformation of agrifood systems and a determinant of firm and farm competitiveness. The concept of quality is complex, its attributes change over time, and its definition varies according to the actors' strategies and cultural factors. It includes food safety, nutrition, and attributes related to commercial differentiation of products. It is a "social construct" that comprises changing forms of certifying products and techniques, firm management and labor rights, and institutional mechanisms of certification and monitoring (Allaire and Boyer, 1995).

The diffusion in developing countries of international quality standards and the changing nature of standards has been treated in an emerging literature (Reardon et al., 2001; Reardon and Farina, 2002; Gutman, 2003; Giovanucci and Reardon, 2000). This has also affected the dairy products sector, as is evident in Argentina and Brazil, which have been undergoing similar trends that influence the evolution of public and private standards in the quality of milk (as an agroindustrial input): (1) the increasing globalization of the national markets, with rapid inflow of foreign direct investment (FDI) and the presence of multinational firms with global strategies, a vector for local introduction of global standards; (2) the deregulation, market opening, privatization, and devaluation that characterized sectoral and macroeconomic structural adjustment; (3) the formation of stratified and dualistic agroindustrial sectors.

Moreover, Argentina and Brazil also have in common that the dairy sector is important to their food economies. In Argentina in 2002, there were 15,230 dairy farms employing some 220,000 persons (although this is employment in milk, wool, and ranching combined, with no statistics separating out dairy farm employment). Sales of processed milk products from about 810 companies reached 4.5 billion dollars in 2000 and processing employed 22,000 persons. Exports were 330 million dollars in 2002. The Brazilian dairy industry is the fourth largest food sector in 2002, with processed product sales of US\$ 7 billion. The Brazilian dairy industry is comprised of approximately 6000 processing plants employing 70,000 workers in 2001. There are more than a million dairy firms employing 3.6 million persons. Milk ranks fourth in farm sales, at roughly 2.2 billion dollars in 2001, exceeded only by beef, sorghum, and maize, but greater than chicken, coffee, and sugar cane. Brazil is the fifth largest milk producer in the world and has 4.3% of global consumption. Dairy product exports became important starting in 2003. While both the Argentine and Brazilian dairy sectors are large, they are both relatively concentrated with many processing plants – but with only a dozen concentrating the lion's share. Moreover, the dairy sectors are still "dual": both countries, the sector is composed roughly of 30% informal, and 70% formal sector line.

Despite the above shared national trends, there are some significant differences between the countries. An important difference is the greater of dairy product

differentiation in Argentina. In Brazil the share of fluid milk in total dairy product production was 26% in 2002 (dominated by packaged sterilized, ultra-high temperature, UHT, milk, with 19% of the total). In Argentina fluid milk constituted only 18%. Both have about the same share in powdered milk (16%). However, in Brazil about 35% of dairy products is mainly commodity cheeses (e.g., mozzarella), while in Argentina that category of wet/non-fluid is much more diverse, being composed of yoghurts, desserts, and butters. Hence, Argentina's dairy sector is a combination of commodities plus a substantial presence of differentiated products, while the sector in Brazil is mainly large-volume commodities. This has important implications, discussed below, for the path of standards development in the countries.

This article focuses on several questions. First, how did public and private milk standards evolution compare between the two countries? (what were the relative roles of public and private standards in quality and safety assurance?) Second, what factors determined the evolution of those standards? We proceed as follows. The second section describes key characteristics of the evolution of the Argentine and Brazilian milk sectors before 1990, which is basically a story about public standards with the emergence at the end of the period of private standards. The third section describes the evolution of standards in the 1990s, which is basically a story about the domination of private standards. The fourth section concludes with the new vision and debate in the countries with respect to what role public standards should play relative to private standards.

## **Evolution of public and private standards before liberalization**

### *Argentina before 1990: public standards dominant, private standards emergent*

In Argentina, the regulatory framework for the dairy sector has been historically weak, both in comparison to other sectors in the country, and in comparison to those in Canada and New Zealand (Gutman, 1999). The intervention of the government in the dairy sector had three foci before the 1990s: (1) protection of the internal market, during the Import-Substitution Industrialization phase; (2) control of the consumer price of key items in particular during periods of inflation and hyperinflation; (3) intermittent fixing of floor prices for milk.

Two sets of laws set public standards for milk in Argentina before the 1990s.

First, Law 6640/63, in force until 1991, regulated the sanitary conditions on the range and in the corral (brucellosis and tuberculosis) and in the milking barns. The law fixed the price of raw milk, and provided price premiums (bonuses paid per unit above the normal price) for modernization (use of mechanical milking and milking barns), for safety (bacterial count), for quality (low levels of impurities due to use of filters), and for increasing production in the winter. In addition, private firms could pay producers additional premiums to attain additional attributes: milk temperature, delivery distance, and volume, for example. The Secretariat of Commerce estimated that in 1985 the public and private premiums represented 9% of

the price of milk coming from farms of average productivity and 85% of those with high productivity (Nun, 1991).

Second, the Argentine Food Code, in effect through the 1970s, required animal and dairy farm hygienic conditions, including the control of brucellosis, tuberculosis and infectious mamitis, defined raw milk and set forth required chemical composition of the milk (minimum fat and protein content, acidity, density, bacterial content, and cooling time) and required pasteurization. These laws were enforced by the Agrifood Quality and Safety Service of the government, which monitored sanitary conditions on farms and certified the hygiene of raw milk. It also certified processors working at national or export level.

Beyond regulation, in the 1980s the government made sporadic attempts to improve coordination between farmers and processors. An example is the Dairy Farm Law of 1986, which created a commission to promote this coordination and a fund for promotion of exports (the export subsidies of which went mainly to larger processors, see Gutman, 1999). The effort focused mainly on prices, little on technology or quality. That law was the “transition” to liberalization as it transferred the pricing system to processors (with the government’s role reduced to intervene in case of conflicts, which actually occurred very frequently).

During the 1970s and 1980s, the large processing firms started to develop, farm-level, incentives and technical assistance to improve quality in order to reduce logistics and transaction costs and facilitate processors strategies of dairy product and quality differentiation. The processors sought consistency of supply. The large processors selected a limited group of efficient preferred suppliers. Improvements in sanitation were encouraged via technical assistance (milking in milk barns (rather than in the open)) and providing financial assistance for such investments. A reduction in seasonality (hence an increase in winter production) was encouraged by companies’ providing farmers technical assistance regarding of animal feeding management (artificial pastures, supplements, silos) and management of the cattle pens/corrals. To lower logistics costs, the dairy processors encouraged investments in cooling tanks by paying farmers as much as 90% over the base price for those making the investment. This improved the logistics of milk collection and delivery to factories, with substantial decreases in transport costs (as cooled-stored milk could be collected less frequently) and losses due to rotting. In that period, and again in the 1990s, the large processors invested in cooling collection plants for the reception and distribution of milk to processing plants. The premiums for milk volume were substantial, encouraging an increase in size of farms. The opening of the export market in the 1980s reinforced the processors’ focus on taking these measures to encourage raw milk quality.

The combination of public standards and public price controls and private standards and private price premiums that characterized the system in the 1970s but especially the 1980s, were in place until 1991. These measures led to a technological differentiation among farmers, and promoted concentration at the farm level (the number of farms fell from 44,000 in the 1970s to 30,000 at the end of the 1980s to only 22,000 by the mid 1990s) and at the processor level.

*Brazil before 1990: dominance of public standards*

The import-substitution industrialization phase 1950–1980 was characterized by trade restrictions, subsidies, and price controls. Industrialization occurred along with intense urbanization, leading policymakers to be concerned with food prices as well as food safety.

In general until the 1990s, the public policy for the dairy sector combined not very demanding requirements for milk safety, with ineffective and limited monitoring of product safety, with price controls that removed incentives to innovate in technology and management.

In the 1940s, the government began to require that milk sold by (formal sector) retailers be pasteurized. In the 1950s, the government instituted obligatory certification of all animal products. The Animal-Products Industry Sanitary Inspection Regulation (approved) in 1952, requiring all firms processing milk to be subject to continuous inspection of hygienic conditions of the plant, of the treatment and distribution of water used in processing as well as waste water, and of milk reception, processing, handling, preparation, cooling, storage, classification, packaging. It also required toxicological, microbiological, histological, and chemical tests of the raw materials and of processed products.

The Regulation also established grades and standards for pasteurized milk: grade-A, pasteurized and packaged on the farm; B, cooled on the farm and processed at a plant; C, with no thermal treatment on the farm, cooled only at collection points of the processing plants. B and C were transported in tanks of 50 l, at room temperature. For A and B, milking had to be done in a milking barn, while C could take place in the pasture. A and B required diagnostic tests of the animals for tuberculosis and brucellosis by an official veterinarian or a private, credentialed veterinarian. Moreover, the regulation stated requirements by grade for the plants and processes, and for monitoring of physical and microbiological attributes of the product.

A key point, however, is that despite the rigor of the standards and regulation, as in Argentina, the government's monitoring capacity was apparently never at the level needed to comply rigorously with the legislation (Jank and Galan, 1998). Indirect evidence of deficient enforcement was the observed (illegal) marketing of raw milk in retail stores. More evidence was the small number of labs certified by the Ministry of Agriculture to perform microbiological and chemical tests (Do Carmo Martins, 2004). Even today, the responsibility for monitoring processing plans is shared by the federal, states, and municipal governments. The products inspected by the Federal Inspection Service can be marketed over state borders. The state (or municipal) inspection certifies products only for sale in that state (or municipality). This dispersion of responsibility favors the persistence of milk processors operating outside the law.

Beside regulation and new institutions, Brazilian dairy policy focused on setting prices along the chain. Price fixing was based on production cost calculations by the Rural Syndicates (known before as the Federations of the National Agricultural Confederation) and the Associations of Producers. These calculations did not reflect the costs of the most efficient producers, but rather of the least efficient. This resulted

in consumers paying milk prices higher than international milk prices, and in not providing an incentive for quality or productivity improvements and investments on farm. The latter was exacerbated by high tariffs on capital goods and high credit costs. Also, the rigid system of grades and standards inhibited competition by quality differentiation via product innovations. The above system left the dairy chain at a “low level equilibrium” by the end of the 1980s. The first act in 1990 was to eliminate the price fixing system and to institute other deregulation, discussed further below.

### **The rise of private milk standards starting in 1990**

Several trends characterized the rise of private standards and their effects on the processing and farm sectors in the two countries, with many similarities, as well as some important differences.

First, in both countries, product market liberalization and privatization over the 1990s included the dismantling of most of the national public institutions set up during the period of import substitution industrialization. In Argentina, the regulations we discussed above (Law 6640/63 and the 1986 Dairy Law) were annulled in 1990 along with the institutions to which they gave rise. Price setting was privatized, an affair between firms rather than between firms and government. In Brazil, deregulation of the dairy market occurred from 1989 to 1993; retail and farm prices were freed.

Second, two other types of market liberalization affected the dairy sector in the countries. Rapid influx of foreign capital as foreign direct investment occurred in processing (with entry of global multinationals such as Nestle and Parmalat with massive scale of mergers and acquisition) and in the supermarket sector. There was a concomitant opening of external markets (import liberalization) and the formation of the trade bloc MERCOSUR (in particular favoring exports of dairy products from Argentina to Brazil).

Third, the above market changes greatly intensified competition at the processing and retail levels relative to pre-liberalization. In Brazil, for example, processing firms 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 stabilization 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 processors. The new investments, deregulation, and new entries drove down prices (the relative prices of dairy products 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 today compared to a decade ago, while from 1997 to 2002 milk production and processing have increased by 3% a year in volume. This suggests that the production and efficiency gains throughout the dairy system have been passed on to the urban consumers. The deregulation of the dairy sector coincided with a rapid expansion in domestic demand, induced by the distributive effects of the stabilization plan of 1994. A rise

in imports was the first response to the new demand. In this first phase, milk production in the formal sector actually dropped and informal sector output increased. After devaluation, dairy imports fell precipitously from 1998 to 2001. Domestic prices fell, but sales rose as domestic demand increases compensated. Import competition was an important push factor for cost-reducing innovations at the farm, processing, and retail level.

Fourth, the rapid expansion of production (and consumption) in the 1990s in both countries was accompanied by the diffusion of modern technologies *at the processing level*. Among the multinationals, as well as the large and medium domestic processing firms, there were changes toward ultra-pasteurised, UHT milk (sterilized milk at ultra-high temperatures), automatic monitoring methods for milk quality, and technologies of “postponed differentiation” (in a given plant, long line of homogeneous intermediate goods and a short line of differentiated products).

The diffusion of UHT milk deserves special attention. In both countries, there was rapid and massive diffusion in the 1990s of UHT milk (displacing pasteurized fluid milk mainly), a move favored by supermarkets targeting mass commodities easily stored, and by consumers seeking cheaper dairy products. In Argentina, the share of UHT milk increased from 11% to 36% of fluid milk between 1993 and 2002. In Brazil, the UHT phenomenon was twice as spectacular: the UHT share went 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. In Brazil, UHT real prices declined more than 40% since 1994. The UHT milk price paid by a consumer in 2003 was only 70% of the 1994 price. By contrast, pasteurized C-grade milk rose 8% in real terms.

UHT technology was introduced in the 1990s in both Brazil and Argentina by the Italian multinational Parmalat, with concomitant change in packaging (introduction of tetrapak, the brand and technology-emboding product of the Swedish multinational). These technology changes at processing and packaging levels were pushed by supermarkets – and permitted a large reduction in supermarket chains’ logistics costs in Argentina (Gutman, 2002; Schaller et al., 2004), and increased milk shelf life; the same was true in Brazil (Farina et al., 2000).

There were several other salient factors driving the particular rapid diffusion of UHT milk in Brazil (compared with Argentina). On the one hand, the urban middle class is a smaller share of the population in Brazil and so expansion of the milk market in Brazil depends strongly on mass consumption products like UHT milk. On the other hand, changes in legislation in the early 1990s in Brazil regarding UHT milk (shift from prohibition to allowance of stabilizers) also contributed to cost reduction of production, increasing the competitiveness of long-life compared to pasteurized milk. The processing of UHT milk requires an input of high quality milk (with low acidity); if not, solids decant inside the machine forcing frequent line stoppages. The use of a stabilizer (sodium citrate) permitted the use of lower quality (more acid) milk for the production of UHT, thus reducing costs and thus retail prices. Hence, the Brazilian dairy industry focused on developing products and processes relatively insensitive to milk quality. Parallel to their vocal position taken with respect to milk quality, the revealed preference in the market and processors was the production of UHT milk, which, after the allowance of the use of the stabilizer, did not require

high quality (quality here defined as microorganism and somatic cell presence) raw milk as an input. It is rather in market niches, such as quality cheeses or grade-A milk, where private standards are implemented, induced by price premiums related to quality including fat and milk content of the raw milk input.

The upshot is that in Brazil in 2002, 19% of milk produced was made into UHT, 16% into powder, and at most 7% in pasteurized form; 33% went into cheese. The product mix is in the main not demanding of quality milk; the latter is demanded only for the categories for which the technology or the market segment requires superior raw material. For raw milk going into the production of UHT and of grade-C milk, the incentive for farmers to implement the private quality standards is to reduce transport costs. The latter is 4–25% of the price received by the producer. The effect of a reduction of transport costs on farmer incomes is thus significant. Because a quality standard translates into the need for investments in physical assets such as cooling tanks, barriers to farm access to credit and the high cost of capital are obstacles to wide diffusion over farmers of the technologies and thus meeting the standards.

By contrast, in Argentina, starting in the mid 1990s, the diffusion of private quality standards plus the requirements of quality certification to export led to a convergence of local private standards of the domestic quality market-segment with international private standards. Hence, large domestic processors and the farms supplying them operated with at least the same quality as the international standards. Data from July 2004 from the Secretariat of Agriculture show that the quality of milk received by eight of the largest Argentine dairy processors (constituting the great bulk of the exports and a high share of raw milk production) exceeded on average the European standard (in terms of proteins, fats, and hygienic and sanitary attributes). Illustrations from the leading two processors are of interest. Mastellone Brothers, the leading domestic processor, started the first private quality assurance program in Argentina in 1978, instituted its own private quality label in 1982 (La Serenísima), and put in place high standards for quality, hygiene, safety, and traceability systems. By 1996 all its suppliers had cooling systems. Another major domestic player, SanCor, a cooperative with 700 farmers and processing plants, meets similar high private standards of quality and safety.

At the processor level, the technological changes had *distributive effects* in both countries. In Argentina, the costs of implementing a quality control system (expenditures on labor and equipment for periodic checks to verify the meeting of standards, improvements in physical and logistical infrastructure) increased the minimum plant size (according to sector experts) to 20,000 l/day. Most processors found it hard to meet this threshold requirement, as 57% of processing firms handle less than 7000 l/day and another 26% handle 7–20,000, so only 17% of the firms have sufficient capacity to be viable for a quality assurance system. Many of the remaining small processors are small integrated operations, where the farmer produces fresh cheeses (cuartirolo, mozzarella), the production of which do not require their milk's meeting high composition or microbiological standards. They operate in informal, local markets where sanitary standards are not met nor worker social security or sales taxes paid and they can thus charge low prices. The Secretariat of Agriculture



estimates that 92% of dairy processing firms are small, and only 10% of the latter meet minimum quality/safety standards. Although these small informal processors are many, their volume share is about 30% of Argentine milk (note that this is about the same share as Farina estimates for Brazil).

Among the small processing firms, the development of private standards and compliance with even public standards is very far from the situation of the largest firms supplying supermarkets and exporting. Much of this is because the government has been unable, in both countries, to effectively monitor compliance, given severe budget problems and the multi-level profusion, just as in Brazil, of government (national, province, local) responsibilities for safety monitoring.

Fifth, in a general sense, these changes at the (large and medium scale) processing level translated into requirements for higher quality of milk *and thus technology change at the farm level*. Tough price competition 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 the farm level, which requires a minimum scale of operations. Moreover, in order to take full advantage of this technology, the producer is encouraged by the processor 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. Tank trucks are other key investments by the collecting plant or the coop. Hence, the investments that arise from the cooling requirement are multiple. In Brazil, Veiga dos Santos and Laranja da Fonseca (2003) note that the requirement of milk cooling at the farm and bulk collection changed massively the face of the countryside in the dairy regions in a very short time, driving out milk can collection and reception of warm milk. They note that milk cooling had the single greatest impact on milk quality. The adoption of two or even three milkings per day, made possible by cooling on the farm, reduces bacteria in milk, as there is less time that the milk spends in the udder.

It is important to note a key difference here between the countries as to the drivers of standards change that in turn affected farmers. In Brazil, the standards change was driven mainly by the processors' keen desire to reduce costs of milk acquisition and processing costs. The improvement in quality was nearly merely an externality of the introduction of new technologies focused on cost reduction. Crucial was the establishment of an inspection system, of physical assets (such as the milking machine, cooling tank, etc.) and of production practices. The monitoring approach thus focused on assets and processes rather than on the product (milk) itself, contributed to the formation of a system of quality assurance – virtually automatic – in the bulk milk collection system for processing.

By contrast, in Argentina, processors needed improved standards to drive down supply chain costs, there was a far greater impetus than in Brazil to put private standards in place to improve milk quality to facilitate the greater product diversification into quality-differentiated products as noted above.

In both countries, the processing firms “pushed and pulled” farms to make the needed farm-level technology changes to meet this new quality demand, through

technical assistance and financial carrots and sticks imposed in contractual relationships, moving away from the traditional spot market relations.

In Argentina, by the second half of the 1990s, the diffusion of cooling tanks on dairy farms had reached all farms producing for the large and medium processors. Price premiums paid for these investments, to which were added public and private credit for example by suppliers of equipment such as Alfa Laval. The premiums encourage sanitary and hygiene practices and discourage the uses of growth inhibitors and the watering down milk. In Brazil, the Census of Dairy Coops in 2002 (OCB, 2002) showed that most already were receiving milk in bulk, providing premiums for higher volume per farmer – 33% below average for lower volume than average, price while above average volume received 5–10% higher than average price. In a survey of 150 milk farmers in 10 regions, Do Carmo Martins (2004) found the most important variable determine price-premium paid to the farmer is the volume of delivery. The motivating factor in the industry is economies of scale in the collection of milk. However, 77% of the producers did not know there were volume premiums offered.

In both countries, there were important *distributive effects* in the farm sector of these new private standards and the implied investment requirements to participate as suppliers to the large and medium processors dominating the market.

In Argentina, the economically viable threshold production level was increased at the farm and processing levels. For a cooling tank system to be profitable for a farmer, the operation had to be at least 1500–2000 l/day. Many small farms dropped out of milk production; there were 22,000 dairy farms in mid 1990s and only 12,000 by 2003. Moreover, there was rapid stratification in the sector, with the rise of large scale modern dairy farms.

In Brazil, there was a large effect on small farmers as shown in Table 1, with perhaps a third of the small dairy farmers leaving the lists of the formal sector processors in half a decade. Part of the “exiting” small farmers enter the informal sector.<sup>1</sup> But many of the farmers in fact are leaving the milk sector – and not just small farmers, but also medium and large. The quality standard alone was not the determinant of this exclusion – rather, the key issue was the financial outlay for the major capital investment needed for implementing the new technologies of milk collection and transport discussed above. Small farmers have limited access to credit (in only a subset of the farmers have access to public credit or processing industry credit). The cost of capital rose in the 1990s, driving out some medium and large farms that had made investments but could not finance the interest payments on the loans. There were also cases where neighboring farms organized around a collective cooling tank and became counted as a single supplier; while statistics are not available, there is a recent shift toward more use of this mode of sourcing from collectives.

In Brazil, the government response to the distributive issues has been to increase public assistance to growers. The federal government instituted a program and cooling tanks, with interest rates lower than the market rates. At first, credit access was

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<sup>1</sup> Some of the Brazilian small farmers excluded from the large/medium processors sold milk via ambulant petty traders, the share of which climbed from 2.6% to 3.5% of total milk from 1987 to 1996.

Table 1  
Largest 15 Brazilian dairy companies by milk processed – 1997–2001

	Annual milk reception (liters million)	No. of milk suppliers	Production per day (liters/day/delivery unit) <sup>a</sup>
1997	5560	175,450	87
1998	5480	152,455	98
1999	5303	133,952	108
2000	5659	114,450	135
2001	5501	97,505	154
2002	6014	95,847	172

Source: [www.terraviva.com.br](http://www.terraviva.com.br).

<sup>a</sup> Each delivery unit corresponds to a cooling tank, which can be individual or collective.

limited, as many of the would-be borrowers did not meet credit-worthiness criteria of the lending institutions, in particular with respect to collateral. Various arrangements among processors, milk coops, and farmers were undertaken to reduce the transaction costs of financial operations (Farina and Nunes, 2003), with the processing firms assuming most of the risk of the operations. While this public financing program was important, it was not adequate to prevent the rapid concentration of the dairy farm sector in Brazil.

In Argentina, while there were also special lines of public credit, the main financing mechanism were the premiums provided by the large processors to the farmers, thus using co-financing to induce technology adoption. Again, this private financing program was important but not adequate to prevent the combination of higher standards and technology upgrading requirements to drive rapid concentration in the farm sector.

### **Re-emergence in the 2000s of the debate over public standards: this time their role relative to private standards**

#### *Argentina: a new role for public standards and safety monitoring under debate*

By the early 2000s, a consensus was emerging that the public standards were inadequate, being below international public standards and in particular well below the local private standards of processors, and not setting milk temperature standards for the farm or hygiene and temperature standards for milk transport. Moreover, the economic growth of the 1990s that had supported rapid domestic growth of the milk market and quality differentiation within it, ended with the economic crisis that began at the end of the 1990s, and the collapse of dollar-convertibility at the end of 2001. The new economy of scarcity brought a resurgence of the conflicts one saw in the 1980s between farmers and processors with respect to milk prices, with the added conflict impetus of the new milk economy, with its strong concentration and stratification. The new context is one of limited internal demand with increasing regional and international export orientation of the leading processors.

In this new context, the institutions and regulatory context of the sector are being profoundly questioned and rethought, with nodes of controversy such as the adequacy of public quality standards, or the relative roles of public and private sectors in determining benchmark prices (Gutman et al., 2003).

In the first half of the 2000s, there is a controversial review underway of the quality parameters in the Argentine Food Code, bringing national public standards up to international standards for milk products. The process is promoted by the large processors, and meets their needs: to provide credibility and guarantees to buyers in export markets for Argentine products, and to reorder competitive conditions in local markets aiming to impose higher and more homogenous (across actors) safety and hygienic standards on all actors in the system. This means an attempt to reorganize the marginal segments, focusing on the forward-integrated small dairy farms.

At issue is who will control raw milk quality and revolves around the formation of a Laboratories Network. The current debate is over who will control the network (as the public sector is weakened by financial crises, the tendency is to see the network as composed of the labs of the large processors, with public auditing of them) and its purview (narrow or broad).

The upshot of the debate in Argentina concerns whether the State will regulate milk product safety based on the results of negotiations among actors in the supply, and use public institutions to audit a network of private labs, or whether private industry will continue to determine standards and monitor the implementation of those private standards with its own labs. Which fork in the road Argentina takes will affect industry structure over time. Homogenizing (via public regulation) over the sector the standards to be implemented (hence, beyond the segment affected by private standards and systems) will mean tougher times for the small firms of the marginal segments, and will accelerate concentration in the dairy industry. The level of the standards will play a role as well; if the public standards are set according to the private standards of large processors, that will raise the bar further for the rest of the sector, excluding those unable to make the investments but raising the overall quality of the national product in conformity with the export market.

#### *Brazil: public standards converging toward private standards*

In the first half of the 2000s, the government formulated and negotiated new legislation to regulate safety in dairy products, as part of a wider 'Milk Quality Improvement Program'. The legislation is expected to make current private standards public, requiring refrigeration at farm level and refrigerated transport systems. This will generalize and accelerate the trends noted above. The current quality/safety levels for pasteurized milk will be replaced by two types of milk: for consumption in fluid form (pasteurized 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. Many of the points of the "Milk Quality Improvement Program" were incorporated, after much debate, into the public standards for milk quality/safety, effective June 2005. It is estimated that presently between 70% and 75%

of milk in the formal sector, or about half of total production in volume terms, is now meeting the public norms. Of course far fewer than half the firms are meeting the standards as many are still small). The many small firms that cannot yet meet the standards probably have important political clout. The new public standards are more demanding than the past ones, in terms of physical, chemical, and microbiological requirements as well as milk storage conditions (clean, cool). By separating product and process standards, the new public standards favor the segmentation of the consumer market, already initiated by the large processors years ago. Yet, to a great extent, the new public standards basically copy the private standards developed by the leading dairy product firms over the years, as discussed above. The process of the transformation of the public system is still ongoing. A possible outcome is the deepening of the differences between the formal and informal sectors, in parallel existence at present serving different market segments; but the public standards changes might also lead to a convergence between the sectors, increasing the level of quality/safety implemented by the informal sector. Whether differentiation or convergence occurs depends little on the standards themselves, as on other factors, such as the growth of income and employment, the main factors for market expansion, the continued segmentation of the consumer market, the enforcement of the new public standards, and of the continued (no-tax) advantage from being in the informal sector.

Improved technologies and quality standards can continue spreading and developing at least among the direct beneficiaries of the trends, the leading processors and the medium-large farmers. The processors depending on bulk collection can provide incentives to producers via price premiums, forming a coordinated sub-system within the overall Brazilian dairy system. This scenario is most plausible for firms that are exporting and face a demanding consumer in world markets, rare in the domestic market, which is still dominated by UHT. In the Brazilian market, superior quality milk is only a close substitute for low quality milk. Left to itself, the market will make adverse selection. Promotion of a universal and compulsory regulation “Milk Quality Improvement Program” focuses on capturing network economies: the value of the investments needed for bulk collection and transport increase with the number of farmers adopting the technology package. There are also distributive issues that cannot be neglected. [Veiga dos Santos and Laranja da Fonseca \(2003\)](#) observe a strong reduction in the electricity costs for the processors, as the bulking and cooling of the milk at the farm level transfer electricity cost from industry to farmers. Moreover, processors also save on labor costs (to clean the tanks, on the lines, and in transport), on steam costs, on equipment (filters and machines to clean tanks). The public system can provide an incentive (as a substitute to the private sector’s incentive through premiums) to undertake the costs at the farm level, at least partially.

Product differentiation is occurring, but in contrast to the Argentine situation, the differentiation is at the low end of the market. In late 2004, Brazil was in a phase of public consultation with respect to “dairy beverages” (a broad category defined as a dairy product resulting from the mix of milk (raw, pasteurized, sterilized, powder, reconstituted, or concentrated)) with whey (liquid, concentrated, or in powder), added to other foods or alone. The milk content has to be 51% or more. This regu-

lation will allow a greater differentiation of dairy products – but at the low end, as substitutes to grade-C milk.

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