MILK AND BYPRODUCTS EXPORTS, IS IT A SOLUTION FOR PRODUCERS OR A PROBLEM FOR CONSUMERS?

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1.INTRODUCTION

The Brazilian milk production has been increasing at great rates year-by-year since the nineties. Between 1996 and 2004, the growth was about 2.96 percent by year, from 19 to 23.3 billion litters. Given that, market participants fear that the production keeps growing at those rates while no politics to motivate the domestic demand or the exports are created. That could result on an oversupply of milk in Brazil in the short term. In this context, prices could move down and a series of problems would reach the domestic market.

Different from exports, milk imports by Brazil have been presenting a downward trend, as showed on Figure 1. It is important to consider that, last year, imports impacted in a negative way on this sector, especially after the Real Plan, when in 1996 Brazil imported 12 percent of the total milk production. That pressed down prices and forced a lot of milk producers to leave the activity[4].

During the last nine years, milk imports reduced from 2.2 billion of litters in 1996 to 326 million of litters in 2004 (Foreign Trade Secretary - SECEX). This decline was a result of exchange rate devaluation in 1999 and of antidumping measures, as well. These actions were taken in the same year to protect Brazilian milk producers against the unfair competition with the product of Argentina and European Union, which were traded at subsidized prices.

However, who will be benefited or prejudiced in the Brazilian milk market with the increasing exports?

1.1. By the producers' point of view

From 2001 to 2004, the Brazilian milk production and the processors plant have been changing. Inside the farm, the quality of the production has become a more important item, especially when it comes to fat and protein. Stocking milk is a process that also passed to be done carefully, in refrigerated tanks. Those adaptations were an exigency of milk processors – they demanded costs reduction during the milk collection, as well as a better quality product.

In 2004, those adjustments gave to Brazil an important victory, called by specialists by "mark of the new history of the milk in Brazil" (Martins, 2004). That victory has benefited not only producers but also the Brazilian economy, on the whole. For the first time in history, in 2004, the Brazilian trade balance was positive in 12.6 million dollars.

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[4]*In 1997, there were among the 15 major milk processors in Brazil about 169 thousand milk producers. In 2002, after five years, there were, among the same 15 companies in Brazil, about 95 thousand producers, a reduction of 43.48 percent in the number of producers. However, the volume produced by those companies increased 23.3 percent, during the five mentioned years.*

Many authors, as Barroso (1961), Magalhães (1971), Martins (1987), Moricocchi (1973) e Peres (1979) mention conditions of the farms in the decade of 70, when properties structure were improper, hygienic conditions, inadequate and, in terms of economy, the authors point out irrational use of the producing factors and the low genetic potential of the milk cattle. Papers from that period relate low technology level and abandon of the activity.

In the decade of 80, Farina (1983) concluded that a bad intervention of the government was responsible for the low production dynamism. Homem de Mello (1985) verified that, between 1977 and 1984, prices received by Brazilian milk producers (in reals) had reduced year-by-year, reaching 66 percent of decline in 1984. In this same study, Homem de Mello alert that it would be necessary an increase of 5.6 to 8.4 percent in the domestic milk production up to 1995, and between 3.8 and 5.9 percent by year between 1996 and 2000, to attend to all the Brazilian market's necessities.

Given the lack of food in 1985 and 1986, the Brazilian government was forced to apply, in the same year, the Cruzado Plan, which would establish parameters for the milk prices, in order to stimulate investments and productivities gains.

In 1991, the government stopped regulating prices settled among producers, and the domestic market was the in charged to supply the population's demands, as well as reduce inputs costs with the purpose of controlling the inflation.

FIGURE 1: Exported and imported volumes of milk by Brazil (in equivalent of litters)
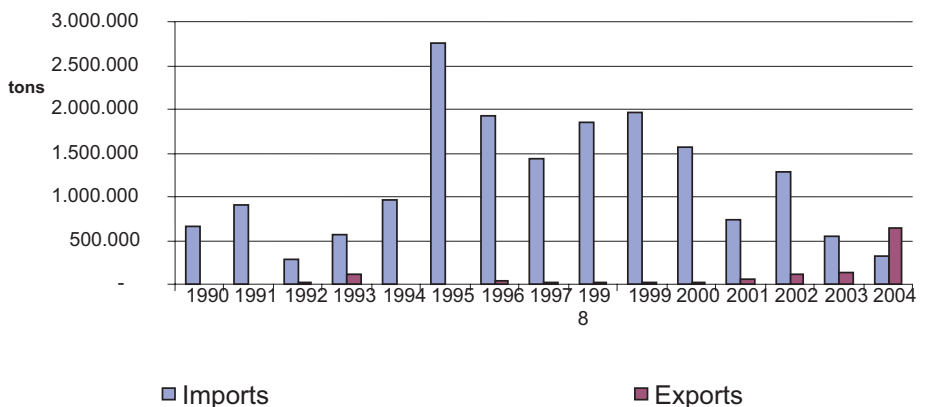
Source: FAO, SECEX

Both goals were reached and a great part of the results was thanks to producers, who had faced decreasing earnings from 1990 to 2001. For those who could get out of this inertness, the unique solution was to improve production scale and productivity. According to IBGE (Brazilian Institute of National Statistics and Geography), considering the last 12 years, the number of milk cows dropped 67.732 heads, while the total production raised 7.1 million litters, in the same period. As a result, the productivity (in litters per cow) increased 49.96 percent (Ponchio e Almeida, 2004).

Analyzing the geometric increasing rate, by using the same IBGE data, it is observed that the number of milk cows have reduced 1.06 percent by year, while the volume produced in Brazil grows 3.3 percent by year. In relation to the productivity, it is verified an increasing rate of 4.41 percent by year (especially during 1996, as the national productivity raised 42.12

percent), decrease of 20.92 percent in the number of animals and increasing of 12.39 percent in the volume.

A series of factors – technical or economical – can explain the gains of productivity. According to Cochorane (1958), mentioned by Martins (2002), that would be a result of the Technological Tredmill – innovated producers take up new technologies and get extra earnings in determinate periods. In turn, growers who resist to new technologies tend to face problems to keep in the activity.

The gain of productivity of producing factors has been observed not only in the milk sector, but in the Brazilian agriculture. Gasques & Conceição (1998), cited by Barros (1999), have calculated the annual increase rate of the total and partial productivities in the Brazilian agriculture based on the official agricultural data. The authors forecast the total productivity of the factors raised 3.38 percent by year between 1976 and 1994; the productivity of the land, 3.79 percent by year, and of the labor, 4.02 percent by year.

FIGURE 2: Brazilian average price for the type C milk received by producers from Jan/90 to Jan/04, excluding inflation impact measured by IGP-DI (Base 100 = Mar/05).
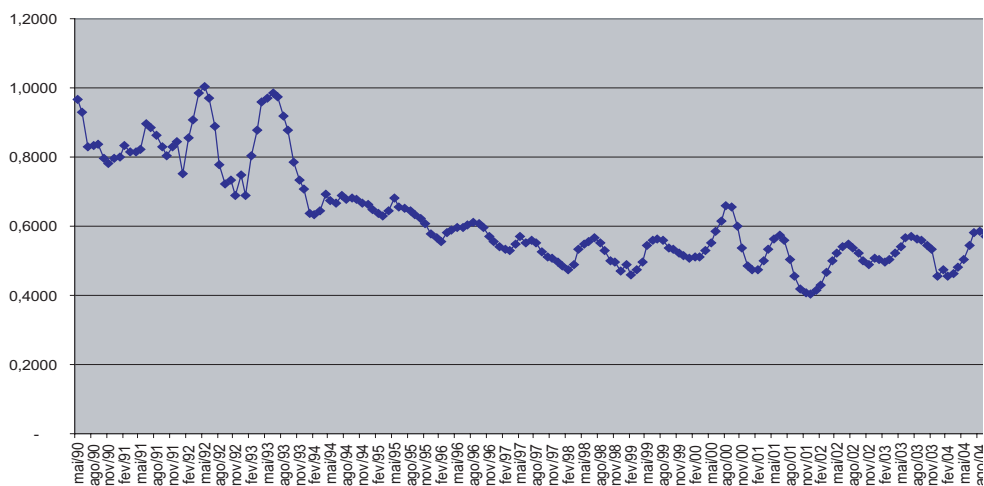
Source: Cepea/Esalq-USP

1.2   By the point of view of milk processors and cooperatives

From 2001 on, as described by Martins in 2002, since the creation of the "advalorem" taxes, differing by aliquots and by the origin country, as an anti-duping strategy, Brazilian milk processors took breath, given a new direction for exports, with positive results in 2004.

It is difficult to analyze milk processors not mentioning the milk cooperatives. Martins et al. (2004) adduce the milk cooperatives, which had 150,912 associates in 2002, distributed by: 14,682 producers were linked to cooperatives with dairy milk gathering reaching 19.5 thousands litters, 34,374 producers adhered to cooperatives with milk gathering between 19.5 and 55.5 thousand litters/day, while 101,855 participated of cooperatives with gathering superior to 55.5 thousand litters/day. In those three parts, the average milk gathering per producer was 43 litters/day, 49 litters day and 118 litters day, in that order. The dairy average

of the cooperatives system was 95 litters of milk.

Therefore, about two in each three milk producers associated to the cooperatives in Brazil was associated to cooperatives that gathering more than 55.5 thousand litters/day. On the other hand, the dairy average reached in the three parts shows that the cooperatives accomplish important social function as involves producers typical of small production. This social action, however, results on high gathering costs and of transformation, which means, of relationship with the cooperated, given the great number that they represent.

In terms of space, the Southerner Region of Brazil concentrates almost half of the cooperated milk producers (52.9 percent), followed by the Southeastern Region (34.9 percent), Center-Westerner (9.1 percent) and Northerner and Northeasterner (3.1 percent). In a general way, nine in each ten cooperated milk producer in Brazil are located on the Southerner or Southeastern Regions.

Between 1986 and 1991, when milk prices were regulated by the government, there were no incentives for gain of productivity among producers and milk processors. In 1991, with no previous prepare, milk processors faced complex trades with producers, creating on the following years great prices' oscillations (Meireles, 1996).

In a context of price instabilities, high production costs (given the low productivity), and low international prices, Brazil imported in 1995 around 16 percent of its total production, with peak in 2001, when imports reached 21 percent of the official production. From that year on, it is possible to find lots of studies about the concentration of the milk processors and of the supermarkets, as Farina (2002), Rodrigues (1999) and Martins & Yamaguchi (1998).

Farina (2002), mentioned by Barros et al (2004), shows that, in 1994, the ten major companies accounted to 23 percent of the retailer food market in Brazil. In 2002, this share reached 46 percent. The same is valid to milk processors. Jank et al (1999) showed that the five major companies traded 50 percent of the total Brazilian production. Barros et al affirms that the C4 (the four major companies) of the domestic milk sector accounted for 35 percent of the official production and 22 percent of the total production. The C8 (eight major companies) responded to 49 percent of the official production and to 31 percent of the total production. Barros et al point out that type of analyze do not consider the regional concentrations.

FIGURE 3: Number of milk processors distributed by dairy production and by sharing on the official milk gathering in 2004
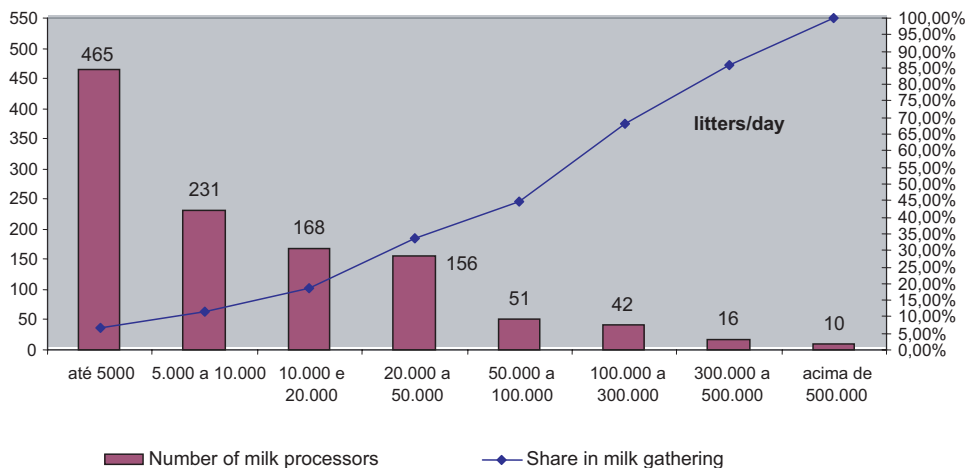
Source: MAPA, elaboration CEPEA- Esalq/USP

Given those considerations, it is possible to note that milk processors passed thru a process of reorganization in order to obtain gain of productivity and consequently reduction of the production costs of the milk byproducts.

In the Figure 3, it is illustrated the distribution of 1,139 milk processors per capacity of dairy milk gathering.

In the Figure 3, it is possible to note that 465 of 1,139 milk processors under federal inspection in Brazil, or 40.83 percent, accounts to 6.52 percent of the official domestic production. The major 10 milk processors – with a gathering superior to 500 thousand litters a day – accounts to 14.02 percent of the total official milk gathering in Brazil.

If the analyze is extended to the 26 major milk processors in Brazil, 4.04 percent of the total, it is possible to conclude that this group accounts to 31.47 percent of the official milk gathering in Brazil. However, according to Leite Brasil, CAN/Decon and EMBRAPA/Gado e Leite (2002), 45.56 percent of the official milk gathering in Brazil in done by 12 milk processors – all of them registered in the Federal Inspection Service. Most part of those distortions can be related to the differentiation among milk processors/companies/central or singular cooperatives, which have many processing unities, with different volumes of milk gathering.

Today, one of the main points of reorganization by the Brazilian milk processors refers to the food security, a request of the society (Bressan and Martins, 2004).

About the processing sector, Bressan and Martins (2004) point some restrictions. One of them is about the technology. National milk processors import from other countries equipments, packages and even technologies. The existent limitations refers to the productivity, which is still low, the loafing, not to much technologic innovation for the processing of tropical fruits, as low level of gain of value in processing and products, as the cheese.

1.3. By the consumer point of view

Barros and Spolador (2005) concluded that the pressure for lower prices by consumers reaches the producers, who have to adopt new technologies to obtain gain of productivity. However, even the growing exports are not enough to control the oversupply in the domestic market, depressing, therefore, the Brazilian prices.

Since the creation of the Real Plan the Brazilian agribusiness has been contributing in a particular way to the country's development. In the case of the milk sector, Barros et al., in 2004, affirm that, "by the point of view of the consumer, the sector's development has been satisfactory as the demand has been supplied at decreasing prices". That can be noted in the Figure 4 – prices paid by consumers have been lower. It is easy to note, by the consumer side (Figure 4), that only the butter price has been superior to the inflation impact measured by IPCA, of Getulio Vargas Foundation (FGV), valuated on 15.75 percent. The other milk byproducts, since the implementation of the Real Plan, the UHT milk (Ultra High Temperature) lost 26.47 percent to the inflation, the dry milk, 14.52 percent, the prato cheese, 17.48 percent, and the mozzarella cheese, 25.65 percent.

One of the major market innovators over the last 15 years was the UHT milk. In 1990, the Brazilian Association of UHT Milk pointed a consumption of 187 million litters of UHT inside 4.2 billion litters of the total consumer of fluid milk in Brazil. That represents a market share of 5.9 billion litters in the Brazilian fluid milk market. It is important to remember that the total Brazilian production in 2004 was about 23 billion litters, and that means that the UHT milk accounted to 19 percent of the market.

Figure 4: Evolution of the dry milk prices, butter prices, UHT prices, prato and mozzarella cheeses' prices from Aug/94 to Fev/05
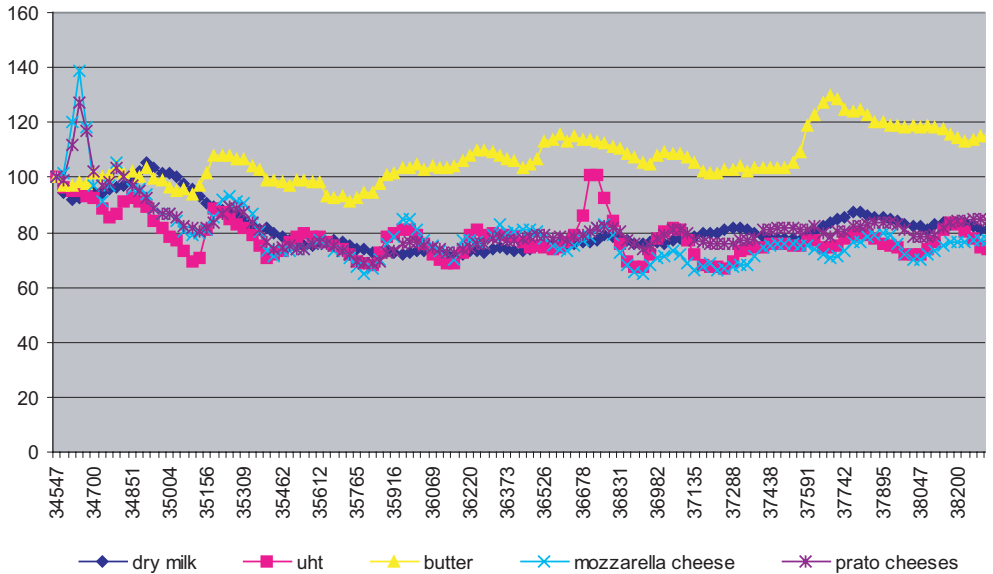
Source: FGV

2. METHODOLOGY

It was specified in this study a model of temporal analyzes that would permit to verify the influence of the milk exports over the prices received by the producers. The main objective is to measure what variables was relevant to explain prices received by producers, as the by-products' prices, imported and exported volumes, controlling these effects by the variables of exchange rate and inflation (IPCA).

Firstly it was realized the test of unitary root proposed by Dickey-Fuller. Following, after tests pointed each variety that should be used in the difference, the regressions were projected by the method of square minimal in which it is assumed that the error term presents a normal distribution with average zero and constant variance (Gujarati, 1995).

Model:

$$\Delta y_{t-i} = \alpha + \sum_{i=1}^{p-1} \beta_i . \Delta x_{t-i} + \varepsilon_t$$

Considering:

y = average price paid to producers in Brazil (R$/litter);

xi = (average price paid to producers in Brazil, prices paid by consumers to purchase UHT, prato cheese, mozzarella, exported volume, imported volume, exchange rate and inflation);

p = number of variables with its delay;

t = periods in months;

μ = stochastic term.

Utilized data of price paid to produces are collected by Cepea/Esalq/USP. Byproducts data, as well as inflation index (IPCA) are calculated by Getulio Vargas Foundation (FVG). For the exchange rate, it was considered the monthly average determined by Central Bank of Brazil.

In Table 1 are presented the variables used on the model, and also its unities of trade.

Table 1: Description of the variables used on the model

Variables	Description	Unity
Br	Average price paid to producer	R$/litter
Uht	Average prices paid by consumers for the UHT milk	R$/litter
Muss	Average prices paid by consumers for the mozzarella cheese	R$/kg
Prato	Average prices paid by consumers for the prato cheese	R$/kg
Imp	Imported volume of dry milk	tons
Exp	Exported volume of dry milk	tons
Camb	Exchange Rate	R$/US$
IPCA	Index for prices paid by consumers	Index 100 =Aug/94
{t }	Delay periods	Months

3. RESULTS

Normally, economical series are not stationary in a short period of time. The price variable presents a behavior not uniform in a given period of time, as the governmental politics, crop reductions, crop failure, seasonal variations, and global shocks can be considered causes for prices oscillation.

In order to verify that affirmation it was done the test of Dickey-Fuller-GLS (Generalized Least Squares). Essentially, this test is based on simple moments of second order; it is better for parameters projections than the Minimal Least Squares, adopted normally in the test of Dickey-Fuller (1979 and 1981). The results are exposed on the Table 2.

Table 2: Resume of tests of Dickey-Fuller-GLS unity roots

Variables	Delay	DF-GLS tau Test Statistic
Prices of UHT milk in retail	5	-3.558*
Prices of dry milk in retail	3	-.1.837
Prices of mozzarella cheese in retail	1	-4.146*
Prices of prato cheese in retail	2	-2.825*
Prices of butter cheese in retail	2	-3.361*
Prices paid to producers in MG	2	-3.546**
Prices paid to producers in GO	2	-2.740***
Prices paid to producers in SP	2	-3.493**
Prices paid to producers in PR	2	-2.387**
Prices paid to producers in RS	2	-2.646***
Prices paid to producers in BRASIL	2	-3.177**
Exchange Rate – R$/US$	1	-3.069**
Imported volume of milk	1	-3.019**
EXPORTED volume of milk	2	-3.913*
Index of prices paid by consumers – IPCA	8	-1.888

It is possible to note that all the values showed important, except for the dry milk prices traded in retail and the index of paid prices by consumers (IPCA). It shows that the model Dickey-Fuller-GLS suppose that the series of prices are not stationary.

The most knew and simple stationary series is the series of the white noise (et), in which if the et (considering t=1,2,3…) are identically distributed and independent, with average zero and variance ($\sigma 2$), the series et is integrated in order zero I (0).

In Table 3 are exposed the data of the proposed model, and in Table 3, the results of the final model. It is important to remember that all calculations and the final model were processed by the program RATS for Windows (v 5.00).

Table 3: Results of the Regression

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Linear Regression - Estimation by Least Squares
Dependent Variable DBRR
Monthly Data From 1994:12 To 2005:03
Usable Observations   124     Degrees of Freedom   117
Centered R**2    0.633969      R Bar **2   0.615198
Uncentered R**2  0.633985      T x R**2      78.614
Mean of Dependent Variable      0.0002589184
Std Error of Dependent Variable 0.0394383672
Standard Error of Estimate      0.0244645751
Sum of Squared Residuals        0.0700263061
Regression F(6,117)                   33.7741
Significance Level of F           0.00000000
Durbin-Watson Statistic             2.111020
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Variable	Coef.	Std Error	T-Stat	Significance
Constant	0.001602228	0.002223343	0.72064	0.47256895
DBRR{1}	0.515764194*	0.089022828	5.79362	0.00000006
DBRR{2}	-0.125271137	0.088124984	-1.42152	0.15782667
DUHTR	0.407256542	0.067871462	6.00041	0.00000002
DMUSSR{1}	0.196287121	0.073851088	2.65788	0.00896317
DMUSSR{2}	-0.219322546	0.067836632	-3.23310	0.00159140
DMUSSR{3}	0.121823150	0.069952838	1.74150	0.08422360

* Significativo a 1%, ** a 5%, *** a 10%.

In this study are presented only the variables that showed significant in the model, which were: price paid to producers in the previous month (DBR {1}), the UHT milk price in the current month (DUHT) and the price of mozzarella within a month of delay (DMUSSR {1}), two months of delay (DMUSSR {2}) and with a delay of 3 months (DMUSSR {3}).

4. FINAL CONSIDERATION

In the beginning of May, price paid to producers in Brazil (average of six states) were almost 18 percent superior from May 2004 in real terms (excluding inflation impact measured by IGP-DI). This conclusion animates producers, involves milk processors in a "battle" and worries consumers about the increasing final prices of milk and byproducts.

In this new context, it is important to identify the function of exports. Is the exported volume, after all, interfering on the current prices of milk?

Preliminary projections point out the importance of the UHT milk and of the mozzarella cheese on the formation of prices paid to producers. On the other hand, empiric results suggest that the milk market is essentially domestic and, at least for now, receive little or no influence form variables as exchange rate and exported volume.

To producers, it is possible to note that prices are strongly influenced from the immediately previous period, effect that disappears from the second month on. In other terms, there are no

effects of the prices' movement from two or three months ago on the current price.

The main product that impacts directly on prices paid to producers is the UHT milk, according to the empiric analyzes. It was possible to conclude that, if the variation rate of the UHT milk increases in 10 percent, the variation rate of prices paid to producers will raise 4 percent.

Following, the mozzarella cheese points as the byproduct that most influence the price paid to producers. Studies show that an increase of 10 percent in the variation rate of this product results on an increase of 1 percent, roughly, in the variation rate of prices paid to producers, always considering the average of the six analyzed states.

Therefore, it is possible to conclude, up to this moment, that the current milk prices in Brazil have been moving in levels supported by the domestic market, mainly by sells of UHT milk.

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