

The supply chain of Italian Parmigiano-Reggiano: an interpretative analysis of market dynamics

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1. Introduction



The production of Parmigiano-Reggiano¹ is complex this being demonstrated by several interconnected subjects that, integrated at various levels, contribute, each with its individual role, to the economic life of the product.

This production is territorially delimited, since the production and processing of the necessary raw materials are confined to a specific area within the provinces of Bologna, Mantova, Modena, Parma and Reggio Emilia. As a whole, the area of production is

1,020,000 hectares with 550,000 hectares of the utilized a-

Abstract

The historic price series of Parmigiano Reggiano shows a curbing trend within a highly cyclical market with yearly variations that may even exceed 10%. In this study, the phenomenon was investigated through the tool of the channel analysis, i.e. attention was focused not so much on each single firm but on their inter-relationship within the production and market chain and on the effects of the firms' behaviours on the market. The proposed correlation model between production and price stems from the simple observation of the dynamics of historic data in the evolution of this market. Any intervention of political economics aimed at stabilising the market has necessarily to involve farmers directly and provide them with the most adequate tools to understand the market and comply with its rules.

Résumé

Les séries chronologiques des prix du Parmigiano Reggiano montrent une tendance à la baisse dans le cadre d'un marché cyclique avec des variations annuelles supérieures à 10%. Dans cette étude, on a examiné le phénomène à travers l'analyse de la filière, l'attention étant non pas sur les entreprises individuelles mais sur les rapports entre elles dans le cadre de la filière productive et commerciale et sur les effets que le comportement des entreprises exercent sur le marché. Le modèle proposé de corrélation entre la production et les prix est le résultat de l'étude des dynamiques des données historiques, et suggère le rôle décisif que les exploitations agricoles exercent sur l'évolution de ce marché. Toute intervention de politique économique visant à stabiliser le marché doit impliquer directement les agriculteurs et leur fournir les outils appropriés pour comprendre le marché et respecter ses règles.

gricultural surface, approximately 3% of Italy's agricultural land (see photo).

The productive chain of Parmigiano-Reggiano, in its present configuration, shows the contradiction of a system which enjoys powerful advantages (standardized and exclusive product characteristics, entry barriers in the way of technology and institution, possession of a predominant share of the market) theoretically sufficient to self-regulate the entire productive process in functioning within the revenue objectives from the monopoly. In truth, it is made up of a frayed merchant community of small, substantially disorganized production units and characterized by self-approved behaviours (self-reliant) leaving them extraordinarily open to error.

Consequently the whole balance is not clear-cut, but continues to provoke a permanent structural crisis in the field, demonstrated by historical fluctuations not only in price (and income) but of the same production (Messori, 1994).

2. Supply chain organization

In the production of Parmigiano-Reggiano, which uses little less than 15 % of the milk produced in Italy, three successive phases and three relative

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¹ The Parmigiano Reggiano requirements are supported by a special legislative standard (D.P.R. 1269 of 30/05/1955, subsequently modified in 1983 and 1990), whose definition states: low-fat cheese, with a firm texture, cooked and slowly matured, produced with rennin of cows milk provided from animals generally in a period of seasonal lactation, whose basic feeding is made up of poly-species fodder medic (*Medicago sativa*). The feeding of cows can be supplemented with feeds authorized by the production protocol, which excludes the use of any silage feed, feeds of animal origin, or genetically modified feeds. Moreover, the Protocol prohibits the use of any preservatives, with the exception of salt, in the preparation of the cheese.

The D.P.R. 1269/55 sanctions the setting up of the Voluntary Consortium of Protection called the Consortium of the Parmigiano-Reggiano cheese (CFPR) whose activities comprise: research and development of the product, control on the application of the production protocol and on the cheese quality, promotion of image, protection of the designation.

The Parmigiano-Reggiano P.D.O. has been registered at the community level in compliance with Reg. EC 1107/96 and the following Reg. EC 2081/92.

integrated productive structures are identified:

a) the phase of milk production that is destined to become Parmigiano-Reggiano, supplied by farms of dairy cows;

b) the production phase and first seasoning (first year) of Parmigiano-Reggiano, carried out by 80% of the cooperative dairies;

c) the second seasoning phase (second year), with packaging and commercialisation carried out in large part by wholesalers-seasoners.

The cheese will then reach the consumers' table through a multitude of distribution channels.

2.1 The farms of dairy cows

The farms of dairy cows, which represent the first stage in the production chain of Parmigiano-Reggiano, are determinant for two reasons in particular:

a) the quality of cheese: the milk producers for Parmigiano-Reggiano strictly adhere to the rules of production determined by the Parmigiano-Reggiano Cheese Consortium, to obtain a milk of high dairy quality suitable for a traditional system of working that commits to producing an unripened cheese for seasoning over a two-year period, without the use of any kind of additive and/or preservative with the exception of salt. Evidently, complying with the norms set out by the protocol guarantees a continuously suitable standard of quality on one hand, while on the other hand, produces high-

er production costs by over 20% compared to the production of milk destined for other uses (food milk, soft cheese, yoghurt).

b) the entity of cheese production: because of the high cost of production, the cheese suitable to become Parmigiano-Reggiano has one exclusive purpose (for economic remuneration) i.e. its processing into Parmigiano-Reggiano cheese. This aspect is very important since the farmers' behaviours influence the strategy of all those present in the chain, as they determine the total supply of milk, and therefore, of cheese (Arfini, 2000).

In the year 2000, farms of dairy cows for Parmigiano-Reggiano totalled 6,945 and bred approximately 300,000 dairy cows. They are mostly (more than 90%) run by farmers.

In the period from 1990 to 2000, the number of breeding farms dropped by 50.7%. This reduction of farms has endured sudden accelerations in the market crises. The drastic reduction in the number of farms instead has not had obvious repercussions on the production of milk destined to become Parmigiano-Reggiano, because the remaining farms have increased the amount of breeding resorting to more intensive forms of management, with the introduction into breeding of ever increasing amounts of technology, requiring external financing to farms.

These phenomena of concentration in the production with an ever-decreasing number of actual breeding farms potentially bring about a rationalization of the organization and

management of the farms. The greater numbers, coupled with an increasingly efficient mechanization of the production process, allow for economies of scale, with an increase in productivity and consequent reduction of unit milk production cost, that shifts from 0.51 Euro per Kg for the herd of less than 50 cows to 0.40 Euro per Kg for those with more than 75 cows, a 22% reduction (C.R.P.A. 2000).

The results of a study conducted in 1995 (Antonello, 1996), on a sample of 1,571 breeding farms for Parmigiano-Reggiano, representative of the provinces of the Parmigiano-Reggiano area, highlight some considerations of a certain interest:

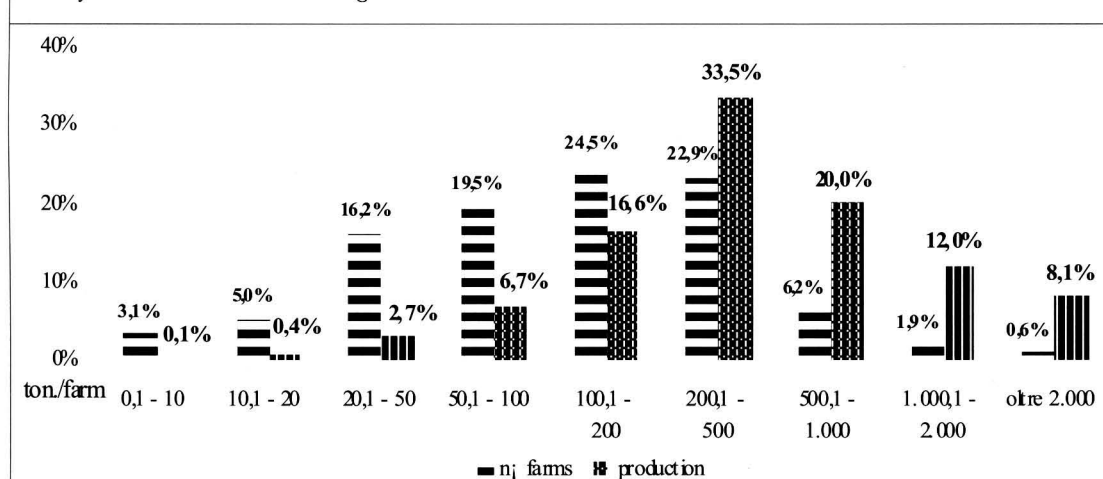
a) nearly 30% of the milk made into Parmigiano-Reggiano is supplied by

Tab. 1 Production of milk into Parmigiano-Reggiano, 1990-2000

Year	Conferring farms	Variation% to 1990	Processed milk (ton.)	Variation% to the 1990	Yield to process	Productive capacity (ton./farm)
1990	14,084		1,628,072		6.72%	115.6
1995	8,613	-38.8%	1,443,500	-11.3%	6.83%	167.6
2000	6,945	-50.7%	1,552,195	-4.7%	6.97%	223.5

Source: elaborations on data of the Consortium of Parmigiano-Reggiano Cheese, 2001

Graph. 1 Distribution of the number of dairy cow farms and the commercialized quantities of cow-milk for class of dimension in Emilia-Romagna in 1998/99



Source: elaborations on data of AIMA (Annuario del Latte, 2000)

only 5% of the farms which produce more than 500 tonnes of milk per year, with more than 100 dairy cows;

b) half of the farms observed, having an annual production of less than 107.6 tonnes compete to produce little more than 15% of the total production.

This indicates that, even if this half of the farmers with less than 15 milk cows decided to close their stable immediately, the consequences to the system would be easily overcome, in the short term, by the remaining half of the farmers. This last event appears realistic, as research shows. In fact, research has shown that in 50% of smaller farms, the age of the youngest farmers exceeds 45 years and in many cases there seems to be no concrete possibility of succession. It is likely that in 20 years, or perhaps even earlier, should a new crisis occur, a few farms will survive year after year; inevitably, many of them will stop their activity along with the retirement of their owners.

Intertwined in these dynamics, as a rigid element, is the Common Agricultural Policy of milk quotas whose introduction represents a limitation on the development of competitive farms, and consequently the growth of the dairies. To overcome this obstacle, they are forced to find new conferring farms. The only farms that could enter the system of Parmigiano-Reggiano are those which, at the moment, supply milk to the food industry. They could change the destination

of their milk only if the difference between the price of milk for Parmigiano-Reggiano and the price of milk as for other uses became particularly significant (Arfini, 2000).

In fact, it should be kept in mind that such a conversion involves a radical modification of breeding techniques, in particular the feeding (due to the exclusion of silage feed), with a considerable increase in production costs (C.R.P.A. 2000).

2.2 The processing companies

In the period from 1990 to 2001, Parmigiano-Reggiano dairies dwindled in number from 861 to 562, a 34.7% reduction; they have decreased to less than half the number of 1970, when there were 1,652. The decrease in the number of dairies has entailed a progressive increase in the volume of processed milk. Over time, the average dimension of dairies has changed from 699 tonnes of milk per dairy in 1970 to 2,672 tonnes in 2000, a nearly four-fold value.

The average data, moreover, do not express the effective productive structure of the sector, characterized by a high level of heterogeneity. In 2000, the top dairies, with a productive capacity higher than 5,000 tonnes of milk transformed per year, represent 10.8% of dairies and process 31.2% of the milk. This same group is heterogeneous since the structures that process 10-15,000 tonnes of milk are not infrequent. The dairies with a productive capacity of less than 3,000 tonnes of milk per year represent 70.7% and process 45.4% of the milk.

This means that a further reduction in the number of active dairies, supposing that the phenomenon affects mainly small to medium productive units, would introduce negligible productive consequences.

A peculiarity of this sector is the absolute predominance of cooperative companies, which in the year 2000 represent 79.3% of total cheese factories and produce 82.4% of the Parmigiano-Reggiano cheese.

Another peculiarity is the typical productive trend of the processing industry. Besides cream and butter, the production of alternative products is not recorded in the Parmigiano-Reggiano dairy because they would not allow a full remuneration of the milk (Nomisma, 1994).

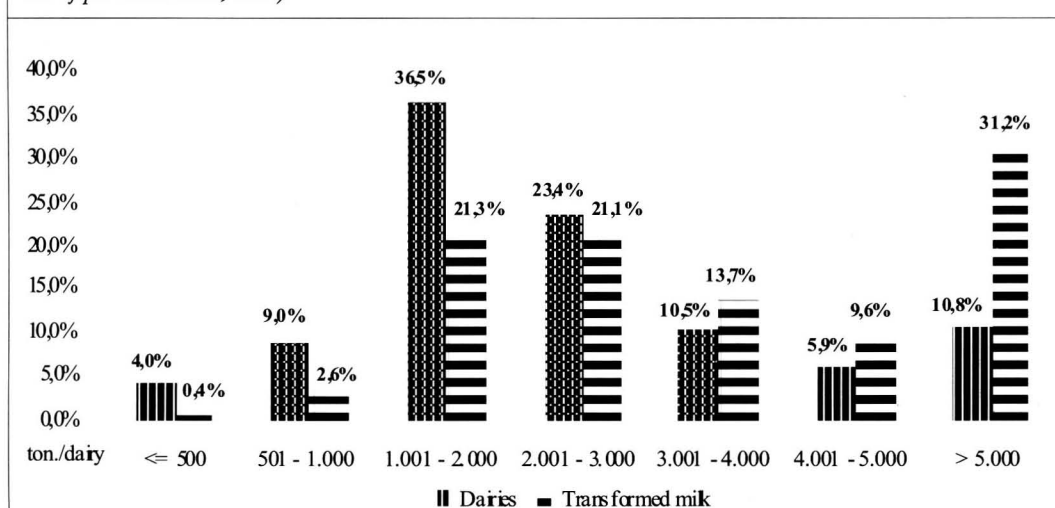
To produce milk of good quality, the payment is expected to be differentiated based on the composition and on the qualitative characteristics with the criterion of awards and penalties on the liquidation price.

Tab. 2 Number of active dairies in the Parmigiano-Reggiano area and productive capacity in tonnes of milk transformed from 1970 to 2000

Year	Dairies		Productive capacity	
	n°	Variation % to 1970	ton./dairy	Variation % to 1970
1970	1,652		699.4	
1980	1,178	-28.7%	1,022.2	46.2%
1990	861	-47.9%	1,890.9	170.4%
2000	581	-64.8%	2,671.6	282.0%

Source: elaborations on data of the Consortium of the Parmigiano-Reggiano Cheese, 2001

Graph. 2 Distribution of the number of dairies and of the amount of processed milk for class of size (in tonnes of processed milk, 2000)



Source: elaborations on data of the Consortium of Parmigiano-Reggiano Cheese, 2001.

2.3 Seasoning and commercialisation

Seasoning is the final working phase of Parmigiano-Reggiano. This phase lasts on average 18-24 months but can last up to three years.

If seasoning may be considered as an integral part of the productive phase in technical terms, from an economic angle it is, in most cases, an activity almost completely separated from processing. It is mainly delegated to a seasoning system outside of the dairies, since, in the majority of cases, dairies are not structurally equipped and sufficiently financed to support the immobilization of a product (and therefore of capital), that exceeds two years.

Seasoning, at least during the second year, is therefore organized by the wholesaler-seasoner, who purchases fresh cheese (after one year of seasoning), and ages it at his own expenses, in his own premises, or in a general storehouse belonging to the banks, from which he obtains a loan on pledge goods with an interest rate slightly above the prime rate (Nomisma, 1994). Once the seasoning is completed, the wholesaler-seasoner arranges for the packaging and the commercialization of the product.

According to the information collected by experts in the field, workers regularly engaged in the seasoning and in the preliminary commercialization of Parmigiano-Reggiano don't exceed 200 units, with a tendency to less than that. This number should not be deceiving since the control of the market would be in the hands of about 10 workers; the 20 most important companies market more than 60% of Parmigiano-Reggiano.

3. The market

3.1. Supply

As far as milk production is concerned, and in due consideration of what has been said before, the supply of Parmigiano-Reggiano is mainly dependent on decision making by farms and the wholesaler-seasoner's policies through the management of his stocks. Although logical speculations are also followed, they can only interfere with the market in the short run and not in a structural way as cheese can neither be stored outside the available spaces, nor it can be placed on the market beyond the available stocks.

Despite a remarkable increase in the early 90's, during the last few decades Parmigiano-Reggiano production has shown very strong cyclical fluctuations which in some cases resulted in yearly variations of 10% or more.

Each productive expansion has been systematically followed by a regressive phase.

These data show how the production increase in the mountain area was remarkably higher than the one in the plain. Between 1970 and 2000 the mountain production was 71% higher than before compared to a 35% increase in the plain. This denotes that although less favoured rural areas are undergoing a population decrease, the Parmigiano-Reggiano production in these areas still represents one of the few activities providing income and capable of keeping people in their territory (Arfini, 2000).

3.2. The final demand

Hard cheeses as a whole are going quite well and have a positive market trend although rates are extreme (Nomisma, 1994).

In the year 2000 Parmigiano-Reggiano, with a slight 0.5% increase compared to 1999, holds the leadership on the Italian market with a share of 41,1% beating the Grana Padano¹ by a narrow margin and going on to reach 47% in terms of share value.

In the last few years exports have increased a lot stepping from about 4% of the whole production in 1990 to 11% in the year 2000. Exports are nonetheless of little importance compared to the inland market.

The spreading of the Parmigiano-Reggiano abroad is mainly hindered by the fact that both the real Parmigiano-Reggiano and its counterfeits (the American Parmesan, the Argentinian Reggianito etc..) bear the same commercial Parmesan cheese name. This is very tricky for the consumers who often take imitations for the real Parmesan cheese produced in Italy.

3.3 Prices

When dealing with Parmigiano-Reggiano you cannot simply consider one price only. On the contrary, you

Tab. 3 Production Evolution of Parmigiano-Reggiano

Year	Total area		Plain		Mountain	
	tonnes	tonnes	%	tonnes	%	
1970	76,265	61,445	80.6%	14,820	19.4%	
1980	79,482	62,916	79.2%	16,566	20.8%	
1990	109,427	86,367	78.9%	23,060	21.1%	
2000	108,235	82,889	76.6%	25,346	23.4%	

Source: Elaboration of data supplied by the Parmigiano-Reggiano Consortium.

Tab. 4 The Italian market extent in the year 2000

	Total of hard cheeses	Parmigiano Reggiano	
Home consumption (tonnes)	182,600	75,049	41.1%
Values (Million Euros)	1.859	0.878	47.2%
Average values (Euros/kg)	10.18	11.69	

Source: Elaboration of data supplied by the Observatory for the Parmigiano-Reggiano market

¹ It is another type of Italian hard cheese from cow milk competing with Parmigiano-Reggiano. It is produced with similar techniques, which are nonetheless different for several aspects such as the use of silage fodder to feed cows, or the use of preservatives during the cheese preparation resulting in lower production costs.

must foresee different prices according to the peculiar technologies employed to make this cheese marketable, the ageing process and grade of seasoning reached, depending also on the transversal ways the cheese property is transferred from both a dairy farm on to their wholesale seasoners, and from a wholesale seasoner to the dealer.

The prices shown on the Chambers of Commerce lists (the CCIAA, i.e. the Chambers of Commerce for Industry, Agriculture and Craftsmanship) are regularly fixed weekly by an appointed chamber committee¹ and they reflect the operators' perceptions.

The prices shown always refer to Parmesan cheese with the trademark Parmigiano-Reggiano stamped on it. Especially for fresh Parmigiano-Reggiano, the prices shown do not take into account the real contract conditions agreed upon by the operators as to the time of delivery and the terms of payment (Annuario del latte - 1997).

Low transparency as to the circulation of information concerning the market is no doubt a negative feature admitted by the market operators themselves. The effect of such deficiency is regarded by several authors as the "market inefficiency of the Parmigiano-Reggiano" giving rise to an "income surplus of speculative nature" for those operators who, thanks to a greater contractual power, can exert their dominance.

3.3.1 The dynamics of prices

In the previous paragraphs we stated that the demand for Parmigiano-Reggiano is substantially steady whereas its production is remarkably cyclical. As a consequence, we should now logically expect a corresponding cyclical fluctuation of prices.

The series of commercialised production historic data (two-year old cheese) and of the Parmigiano-Reggiano price since 1972 were confronted with one another in order to sustain this theory. As far as prices are concerned we have been referring to those reported on the trade directories supplied each year by the Chamber of Commerce (the CCIAA) of Modena.

Here are some explanatory notes so as to help correctly interpreting the data provided. First of all, due to the cheese market problem of low transparency, the operators of the Chamber of Commerce have clearly pointed out how difficult it is to report on the bulletins values which are truly representative of the real negotiations. To the aim of this study though, the cheese price supplied by the Chamber of Commerce does in no way represent the real one at a given time, it stands instead for a trend of prices in time. Therefore, although the prices revealed may be mistaken and might not perfectly collide to the real ones, they will still be representative of the trend. Moreover, the ways the cheese prices are es-

tablished changed with time and the same is for the classified peculiarities appearing on the price lists and required to make it marketable.

We have anyway tried, with the help provided by the operators at the CCIAA (the Chamber of Commerce) of Modena, to link together the cheese different technical characteristics during the years, thus availing ourselves of homogeneous series of historic data for each type of product and relevant commercialisation forms.

We have thus obtained four typical price characteristics for marketing Parmigiano-Reggiano. The first three relate to the wholesale market in Modena, the fourth one is relevant to the consumption prices in the town of Modena:

- Wholesale price "A": Entire lot (part of a stock dating back to 1999) of fresh Parmigiano-Reggiano (produced the solar year previous to the price survey) sold ex-dairy factory;
- Wholesale price "B": Partial lot of "seasoned" Parmigiano-Reggiano (dating back to the second solar year previous to the price survey) sold ex-wholesalers' stocker;
- Wholesale price "C": "seasoned" Parmigiano-Reggiano out of a choice of whole cheese lots;
- Consumption price "D": First choice Parmigiano-Reggiano seasoned for 18 months and more.

By applying a further simplification, should we consider it as such, as far as the wholesale market is concerned, price "A" is taken into account in relation to the commercialisation of Parmigiano-Reggiano between the dairy farm and the seasoner, price "B" in relation to the marketing operated by the seasoner and the wholesaler, and price "C" considering the commercialisation provided by the wholesaler and the shopkeeper.

We should not forget, though, that in reality there is not a clear-cut separation between each role. In most cases the seasoning of cheeses, for example, is completed directly by the wholesaler or, at times, by either the single dairy farms on their own or in association with some others.

Notwithstanding the fact that on the price trade directories the quotas listed are on a monthly basis, in order to make the market dynamics more intelligible to the reader we have analysed the average yearly values. In order to compare values which are far between in time, the inflationary effect on them has been neglected by changing the current values into the correspondent constant ones of the year 2001.

Bearing in mind the reserves we have made as to the nature of the available data, some important considerations based on the analysis reported in graph 3 will follow.

1) Market variability: A market that for thirty odd years has shown price variations in the range of 10-15% at constant values, i.e. already deprived of the inflationary effects, and reaching quite often top variations above 20-30%, cannot certainly be defined a steady market.

¹ The Chamber of Commerce states what the price must be by observing and taking into account the real prices applied and the ascertained quotas. Both the average prices and the data base are submitted for examination to a "Regional Price Committee" appointed on purpose. They will verify that the data they are provided with correspond to the real price level and the market trend, and they will subsequently and concurrently approve those data or ask for integrative measures. This Committee is made of effective members nominated by a Regional inner meeting besides some consultants representing the operators in the field who belong to the various categories involved (Nomisma, 1994).

Tab. 5 Marketable production (two-year old cheese) and prices of Parmigiano-Reggiano (constant values to the year 2001 on the market of Modena)

Year	Marketable Production (tonnes)	Prices (Euros/Kg)			Consumption D
		A	Whole-sale B	C	
1972	76,265	13.09	14.49	16.31	19.32
1975	83,912	9.64	9.96	11.81	14.22
1978	71,493	19.43	21.00	23.54	26.56
1980	84,808	10.72	12.05	13.93	18.08
1984	83,256	14.37	15.24	17.68	20.37
1985	84,206	11.81	14.22	16.59	20.06
1990	99,230	9.13	11.34	12.64	17.40
1993	106,264	7.67	8.81	10.14	14.52
1995	92,056	11.84	13.40	14.72	18.44
2000	110,128	7.45	8.02	9.58	14.77
2001	108,673	8.25	8.83	10.14	14.82

Source: Elaboration of data supplied by the Parmigiano-Reggiano Consortium and Chamber of Commerce of Modena.

2) Market uniformity: despite the fact that the different marketable types of cheese are reported as having comprehensibly different prices, the trend of prices as shown on the various lists is extremely coherent and prices are globally the same even when considering a "fresh" cheese. As a logical deduction then, a cheese belonging to a certain annual production and with a certain price can nonetheless undergo completely different market prices during its entire commercial life span. This situation is at the seasoner's own expenses and they are the ones to pay the debt in the first place. They buy the cheese at a given time and price to sell it the following year at completely different market conditions. As a consequence, the price they sell it for is not remunerative due to the high costs they have gone through. Sometimes it is even lower than the price they paid for that cheese. No wonder the experts in the sector claim that in actual facts seasoners are almost extinct as sheer intermediary figures.

Although from the second half of the 80's onwards the re-

tail market had a trend similar to that of the wholesale market, the former kicked back and responded less strongly to the production changes.

During the periods of decline, the consumption prices went down less swiftly than wholesale prices. Likewise, when the market trend was on the rise, the retail prices started to go up nearly a year later than the wholesale ones.

3) Production related to prices: by observing graph 3, a steady and constant inverse relation can be pointed out between the marketable production (that which is ready for consumption and is therefore forwarded to be placed on the market) and the relevant prices on the market.

In order to verify the actual existence of such a relation we tried to give it a mathematical interpretation so as to obtain a series of expected

prices, inverse function to that of the marketable production, to be compared to a series of prices observed through a pattern minimising the standard deviation.

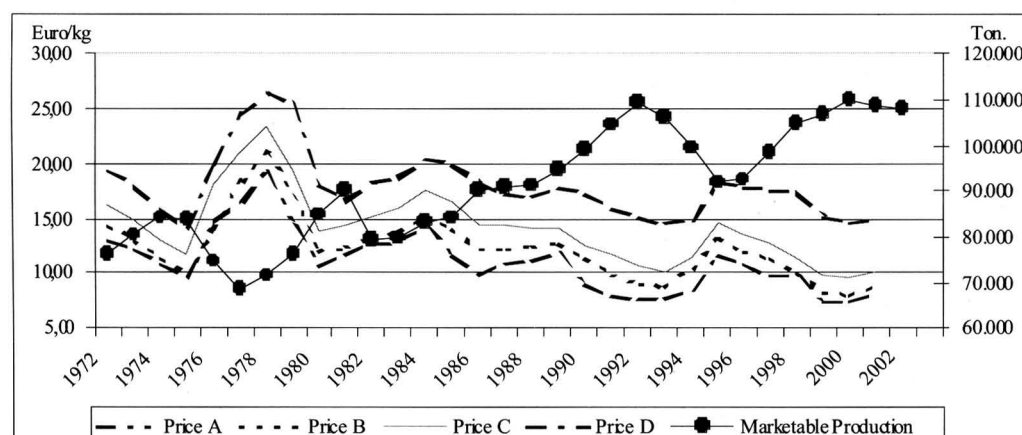
The equation we set forth is:

$$Y_i = \frac{Pr^n Pz}{X_i^n}$$

Whereby:

" Y_i " is the expected price in Euros per Kg for "i" year;
 " X_i " is the marketable production in tonnes of "i" year;
 "n" is the exponent given to the production taken from a pattern minimising the average quadratic disparity
 "Pr" is the average yearly production in tonnes;
 "Pz" is the pondered average price in Euros per Kg.
 Being "n", "Pr" and "Pz" constants for the whole length of the period studied, we infer that Y_i is an inverse function of X_i only.

Graph. 3 The trend of the marketable production and constant value prices of Parmigiano-Reggiano in the Modena area up to 2001

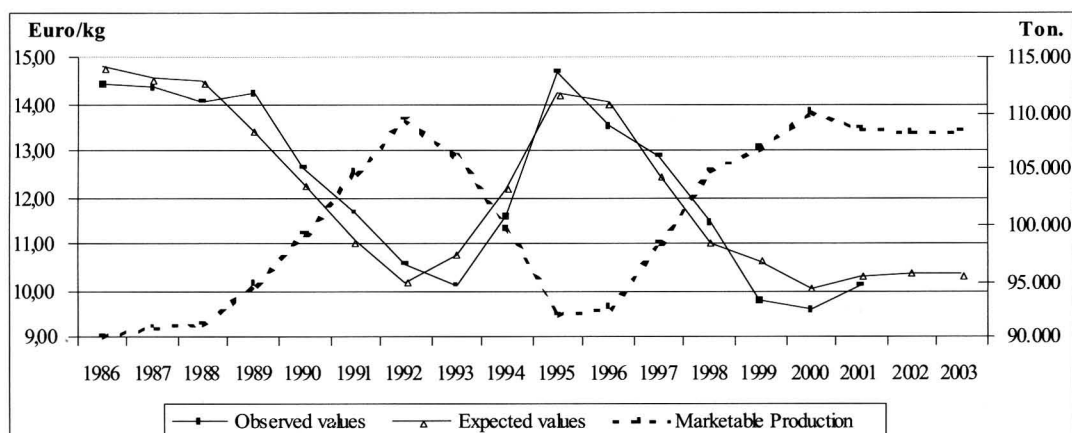


The following graph shows how this formula is applied to price "C". Even if there is not a perfect adherence of the series of prices observed to the corresponding series of expected prices (we had anyway no intention whatsoever to state here that the only factor determining a market price is the production entity), the coincidence occurring between the series does not turn out to be casual.

According to these elements, we get the following results:

- production exponent "n": 1.9347;
- average annual production:

Graph. 4 Mathematical relation between the constant value of price "C" in 2001 and the marketable production



100,032 tonnes;

- observed average pondered price: 12.11 Euros/Kg;
- average expected pondered price: 12.17 Euros/Kg;
- disparity of the average pondered prices: 0.06 Euros/Kg (0.46%);
- average quadratic disparity: 0.52 Euros/Kg (4.31%).

The application of the formula (with different production exponential powers) has supplied values for the average quadratic disparity which do not differ much from what has been said (price "A" 8.11%, price "B" 5.70%, price "D" 5.01%).

Since the productions of Parmigiano-Reggiano in the years 2000 and 2001 which will be marketed in the year 2002 and 2003 respectively are already known, it is possible to extend this pattern of calculus to the above mentioned years.

The expected prices for the years 2002 and 2003 are not meant as a prediction. The simplifications the pattern is constricted by are such that the required reliability cannot be guaranteed. In due consideration of the past experience, they are rather meant to express how the market trend should be having to absorb an already existing production, and therefore well known, when this one needs to be marketed. Should meanwhile the factors determining the market change, and in particular the consumers' behaviour, it goes without saying that the values set forth would lose their entire significance.

4. The operators' margins

Having analysed the prices at their constant values, we can now go back in time during the years and work out the various operators' margins of profit all along the Parmigiano-Reggiano trade line.

Table 6 shows the process of formation of the consumption prices year after year. It shows even better how this affects the margins of profit of the different trade operators.

In order to counterbalance the effect of market unsteadiness the average values of two periods of time have been extrapolated: the first time span is from 1972 to 1990, the second one from 1991 to 2001.

As statistical data for the costs sustained by the operators

are not available, it is impossible to do any reasoning about how profitable the different phases were.

The value of the residue for the productive companies first in line compared to other food stuffs is rather high. In case of farms members of dairy-farm co-operatives, the farmers are left with 40% of the consumption price (considering a process cost of 2.20 Euros per Kg as a reference).

Nevertheless the observation of how the historic series

behaved allows us to make some interesting considerations about the strong contractual power of the commercial distribution.

Actually, as it clearly appears from table 6, if during the 90's the average consumption price of Parmigiano-Reggiano as a constant value was 16.1% lower than the average price of twenty years earlier, this was mainly due to the producers' and wholesalers' reduction in the margins of profit to the extent of 30.1% and 32.8% respectively. Thanks to a process of structure reconstruction leading to an abatement of the production and marketing costs, these operators could obviously go on working. Conversely, the process to build distribution anew was of no avail to reduce the final consumption price and, on the contrary, during the time span considered the distributors' margin of profit went up to 39.5%.

The strong contractual power of the G.D.O. obviously allowed them to take advantage of the effects of a distribution restructuring process so as to augment their own margins of profit. It must be pointed out, though, how the average consumption price does not comply with the miscellaneous reality of distribution, which is characterised by different forms of sales and each single one with its own peculiar price. In fact, after comparing the different forms of retail prices at their constant values in the year 2000, we have found out that traditional shopkeepers have applied a price reduction of 19.8% (thus losing in the last few years the record they had held that far for the highest average price of sale), followed by "Hard Discount" with a reduction of 12.5%, the Mini-markets with a 10.2% decrease, the Hypermarkets with 9.5%, and finally the Supermarkets with a 3.6% price reduction.

Assuming that within the boundaries of designated Parmigiano-Reggiano cheese this product is virtually unchanged, unless you consider its age and some faults it may show, on a product par, well informed consumers can choose to buy it at the point of sale that suits them best.

Tab. 6 Margins of profit at constant values to year 2001 for trade operators

Year Production	Year Sale	Price D Euro/kg	Margin to the retailer		Margin to the wholesaler		Margin to the seasoner		Residue value to the dairy		
			Euro/kg	%	Euro/kg	%	Euro/kg	%	Euro/kg	%	
1970	1972	19.32	3.02	15.61%	1.82	9.41%	1.56	8.07%	12.93	66.91%	
1975	1977	24.56	3.48	14.18%	2.53	10.30%	3.66	14.91%	14.88	60.61%	
1980	1982	18.29	3.03	16.55%	1.96	10.72%	1.48	8.08%	11.83	64.65%	
1985	1987	17.25	2.88	16.72%	2.07	12.02%	2.38	13.80%	9.91	57.45%	
1990	1992	15.21	4.64	30.53%	1.44	9.44%	1.20	7.90%	7.93	52.14%	
1995	1997	17.62	4.71	26.76%	1.47	8.35%	0.59	3.34%	10.84	61.55%	
1999	2001	14.82	4.68	31.60%	1.31	8.84%	1.37	9.28%	7.45	50.28%	
1972-90 Average value			19.20	3.33	17.3%	2.08	10.8%	1.02	5.3%	12.77	66.5%
1991-2001 Average value			16.10	4.65	28.8%	1.40	8.7%	1.13	7.0%	8.93	55.4%
Variation during the two periods			-3.09	1.32	-0.68	0.11	-3.84				
			-16.10%	39.5%	-32.8%	10.7%	-30.1%				

Source: Elaboration of data supplied by the CCIAA (Chamber of Commerce) in Modena and the Bureau of Statistics of the Municipality of Modena

5. Conclusions

The dynamics of production compared to that of prices denotes a strong link between the quantity of seasoned Parmigiano-Reggiano placed on the market and the relevant price. Following the literature we have analysed and the investigations carried out in the past few years, there is no evidence of any policy to sustain prices so as to deduct exceeding shares of product from the market. As a consequence, despite the different price conditions, with time the cheese whole production has always been absorbed by consumption. Actually, at least in the last few years, the price dynamics of Parmigiano-Reggiano has not been linear at all showing, on the contrary, a remarkable cyclic trend. Prices swing up and down systematically according to different stages.

When no mechanism and instruments are there to withdraw exceeding products from the market, this peculiarity leads to a demand for Parmigiano-Reggiano that can be defined as viscous and static. So much so that varying quantities of cheese placed on the market are similarly absorbed at varying prices. This can be summed up with a market definition of the Parmigiano-Reggiano as "unstable".

In other terms, the market instability is mainly and clearly caused by a cyclic production which triggers out from a natural response of the producers to market condition changes.

We may now wonder why the producers achieve productive levels leading to sometimes quite strong market condition crises.

The fact that Parmigiano-Reggiano cheese is unstable on the market appears to be rather a consequence of the difficulties farms encounter when they have to adapt to market condition changes. These difficulties are caused by miscellaneous factors such as:

1) An information network for farms based on the price of milk only which is given by the price of cheese. This type of information reveals how productive levels were reached two

years in advance (as a 24-month seasoning is needed) and planned at least three years before by those farms determining the productive levels on the basis of some 3-year-old outdated information they took into account thus falsely interpreting the market;

2) The inflexibility of the productive system leading to a longer time of response to the market by companies in the sector. Besides EC's instrumental agricultural policies such as the

milk quota regime, this rigidity is due to a lack of alternative outlets for raw materials;

3) The fact that the Consortium for the cheese safeguard does not plan production despite all dairy farms are associated to it and, therefore, all Parmigiano-Reggiano producing farms generally rely on it.

The Parmigiano-Reggiano productive companies are therefore forced to operate within a market with oscillating prices tending to go down. These fluctuations affect the companies' revenues in a strong way and cause problems to the planning of investments. The cheese high quotes at favourable times can particularly induce to investments which will have to be paid back at subsequent negative market conditions. Despite still being economically good, such investments can cause serious financial problems that can sometimes lead to fatal consequences for the well-being of the activity established. In the specific case of farms we have noticed that, at least in dire straits, investments are financed through underpaid family work and capital within the farm.

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