

Lessons from US Dairy Policy on Value-Added Sharing

A path of reform for the CAP to reorganize French milk production



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Auteurs

Frédéric Courleux, Director of studies
Christopher Gaudoin, Strategic analyst

Contact et informations

<http://www.agriculture-strategies.eu/>

You can also contact us by mail:

christopher.gaudoin@agriculture-strategies.eu

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Summary

Improving the mechanisms for value sharing within the value chains and strengthening the organization of producers are two topics at the heart of agricultural policy debates at both the French and European level. In France, the dairy sector has been particularly concerned by these issues since the end of milk quotas, and the "contractualisation" put in place since 2010 does not seem to have given sufficient answers.

Also very connected to international trade, the American dairy sector was less impacted by the crisis of global overproduction that began in 2014: the milk price differential was clearly to the advantage of US producers and production and exports have continued to grow.

Since the 1930s, milk has been marketed in the United States through Federal Milk Marketing Orders, which are made up of two-thirds of producers in a given region. There are currently 10 federal marketing boards and Californian producers have just voted to create the 11th. In this way, 80% of US production is affected by this regulatory measure.

The main function of the boards is to achieve fair value sharing between producers and processors on the basis of price formulas. Each month is thus defined an identical minimum price for all producers. It is based on the evolution of the markets for processed dairy products. The price formulas are modifiable but they are now identical for each of the 10 offices and stable for at least 10 years. The operation of the system is based on a significant transparency of the actors of the transformation who must notify the volumes and the selling prices of the finished products.

If the minimum monthly price is the same for all producers in the same office, the price at which the processors buy supplies differs according to the type of valuation they make. Equalization is thus directly effected between companies positioned in high-value-added segments that give up part of the value thus created to companies with less good "mix-products". This is the equivalent of 10 to 15% of the turnover of milk producers who transit through the offices to operate this equalization.

The policy of sharing the value of milk at work in the United States bears witness to American pragmatism in economic matters. The perishability of the milk induces a situation of economic dependence between producer and processor: we will never see 3 tankers follow each other in the country roads to go, every 2 or 3 days, to solicit the producers and offer them a different price. Thus, since the spontaneous formation of a market price is not possible, the Americans have chosen to institutionalize the formation of milk prices while leaving markets open for other dairy products.

Using French data on prices and volumes of processed products, we have transposed the FMMO price formulas to the French dairy farm. Comparing with the price received by French producers over the period 2007-2016, the transposition of the US policy of sharing value added would have generated - all other things being equal - a rise in the price of milk of 13% or € 43 / 1000 liters. This result is explained in particular by the significant weight of cheese in the FMMO price formulas.

In addition to the United States, Canada also has a collective marketing system that allows equalization between different valuations. Giant cooperatives in the Netherlands, Denmark and New Zealand have a quasi-monopoly situation at the national level that allows them to carry out equalization internally. Faced with these competitors, French producers suffer from a

competitive organizational disadvantage: the cooperatives collect about 55% and transform 45% of the French milk production.

The level of valuation of industrial products seems to have an excessive weight in the setting of prices in France whose level would be largely determined by the product mix of the main cooperatives. The average valuation of the latter is less good because they have had to recover volumes during the restructuring of the transformation in order to avoid collection stops in certain territories, where private companies have been able to develop valuation strategies centered on the most profitable consumer segments.

Given the tensions regularly observed in the industry and sometimes archaic commercial practices - unilateral termination of agreements, pricing after removal, etc. - it seems necessary to reorganize producers to get them out of excessive economic dependence. Failing this, the decline of the French dairy sector, which is starting to manifest itself in the non-recovery of output volumes, could lead to a drop in production of at least 30% by 2030.

The "contractualisation" initiated in France to anticipate the end of milk quotas has not produced the expected results. A contract alone can not rebalance a business relationship. With the end of the quotas approaching, the formation of sufficiently strong Producer Organizations (POs) has not been accompanied by the public authorities (delay of the decree on the recognition of POs, no use of the 2nd pillar of the CAP). And dairy cooperatives have obviously wanted to stay on the fringe of "contracting".

The extension of the logic of "sectoral interventions" announced for the post-2020 CAP could accelerate the reorganization of the dairy sector in France. Already at work for the fruit and vegetable sector, "sectoral interventions" can encourage the formation and financing of POs (usually cooperatives) for their R & D, risk prevention and, above all, planning activities. production and adjustment of production on demand. Conditionalizing aid coupled with participation in a PO would also be an attractive incentive.

French dairy cooperatives will therefore face a crucial choice. Either they decide to take the bull by the horns and organize, by homogeneous territorial entity, their rapprochement with the existing POs in order to gradually integrate the producers of the latter as co-operators. Either POs will be formed within the cooperatives and these POs will be organized into a Producer Organization Association (PDO) at the basin scale and the cooperatives will then specialize in their transformation activities, as in the United States.

It would then come out of the paradoxical situation of the French dairy farm where, on the one hand, a half of producers is well organized in cooperatives whose valuations of milk are average, and on the other hand, half of barely organized producers. in POs with no real bargaining power over highly placed processors in higher value-added segments.

It is therefore crucial that dairy producers get mobilized now to anticipate the next CAP reform and work towards the reorganization of production in order to be at the heart of the management of volume management and the sharing of added value within of the sector.

Introduction

Improving the mechanisms for value sharing within the value chains and strengthening the organization of producers are two topics at the heart of the agricultural policy debates at both the French (Food States) and European level (Report of the Task Force on the functioning of agricultural markets (2016), Omnibus Regulation, Unfair Commercial Practices Directive).

In France, the dairy sector is particularly concerned by these issues related to dysfunctional dairy markets, and in particular to the formation of the price of milk. The "contractualisation" put in place since 2010 does not seem to have given sufficient answers. The end of milk quotas has even increased the economic dependence of producers in a French context where the weight of cooperatives is much lower than among the main European counterparts.

Also very connected to international trade, the American dairy sector was less impacted by the crisis of global overproduction that began in 2014: the milk price differential was clearly to the advantage of US producers and production and exports have continued to grow. An interest in value-sharing mechanisms within the dairy industry in the United States has therefore seemed all the more relevant since this aspect of the Farm Bill is generally unknown even though it has been in place since the 1930s.

This study seeks to understand in detail the functioning of the Federal Milk Marketing Orders (FMMOs) in order to discuss the possible transposition of this policy of sharing value added to the French dairy sector. It is organized in three parts:

- the first part describes the objectives, evolution and mode of operation of the FMMOs. Particular attention is paid to the mathematical formulas for establishing the minimum monthly price for milk and the principles of equalization between processors;
- the second part seeks to transpose FMMO price formulas to the French dairy farm in order to compare the value sharing in the American case and the French case;
- the third part proposes a discussion on the reasons and the possible means to accompany a reorganization of the milk production sector in France in order to improve the overall functioning of the sector and in the perspective of the next reform of the Common Agricultural Policy (CAP).

I. Federal Milk Marketing Orders (FMMO)

1. FMMO history

The first forms of organized and collective marketing date from the end of the 19th century, and more precisely from 1880 when a milk marketing system based on a classification of markets was at work in Boston (Novakovic, 1994).

At the federal level, it will be necessary to wait for the measures aimed at getting out of the crisis of 1929 and the New Deal, so that the bases of the framework of regulation which is still at work today emerge. The Agricultural Adjustment Act of 1933 allows processors to establish "marketing agreements" (Greene, 2017). The 1935 amendments go further and give the USDA (the US Department of Agriculture) the power to set minimum prices for milk.

But it is the Agricultural Marketing Agreement Act of 1937 that will establish the Federal Milk Marketing Order (FMMO) or federal milk marketing boards. Unlike most US agricultural policy measures, the FMMOs have since had a final status: they are not subject to re-authorization at the end of the validity period of each Farm Bill. This partly explains why agricultural debates generally make little mention of milk marketing boards and that, on this side of the Atlantic, this mode of regulation is not well known.

FMMOs have a central role in the US dairy industry: they are responsible for establishing a minimum monthly milk price based on the evolution of processed dairy products markets. They ensure the sharing of added value between the links of production and first transformation within the area of practice of each FMMO.

The general objectives of FMMOs are threefold (Griffith, 2016):

- Ensure stable and orderly marketing;
- Guarantee reasonable prices for both producers and consumers;
- Secure the adequate supply of milk (in particular liquid form) to consumers.

Although the regulatory framework defining marketing boards has been in place for more than 80 years, they have evolved. The first major series of amendments dates from 1960. Faced with the increasing spread of products between States, especially for processed products (butter, powder, cheese), the methods for calculating the minimum price specific to each FMMO have experienced a wave of change. standardization (Griffith, 2016).

The second major series of amendments was decided in 1996. The objective was then to consolidate the 33 existing FMMOs at the time to bring about a dozen. This reform was effective in 2000 and resulted in 11 FMMOs.

In 2004, the dissolution of the Western Milk Marketing Order (which included the states of Idaho and Utah) reduced the number of FMMOs to 10 (USDA, 2004). But the creation in 2018 of a new Marketing Order in California - on the basis of a pre-existing double quota system (see below) - means that currently the 11 American FMMOs ensure the formation of milk prices for more than 80 % of United States milk production (Figure 1).

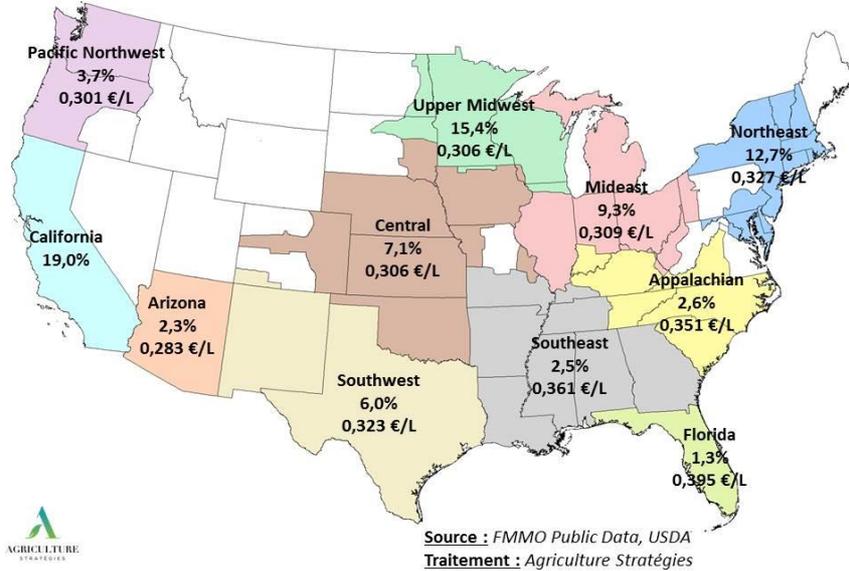


Figure 1 : Map of FMMOs and share of US milk production in each FMMO

Figure 2 below shows the number of FMMOs as well as the share of US cow's milk production for which they define the minimum monthly price. The data (USDA, 2016) has been completed in the recent period to reflect the integration of California. The share of US production affected by marketing boards gradually increased to about 2/3 of production in the early 1970s. The fall in the number of FMMOs is largely the result of their merger. The establishment of the FMMO California is a significant development that tends to reinforce the regime currently in place.

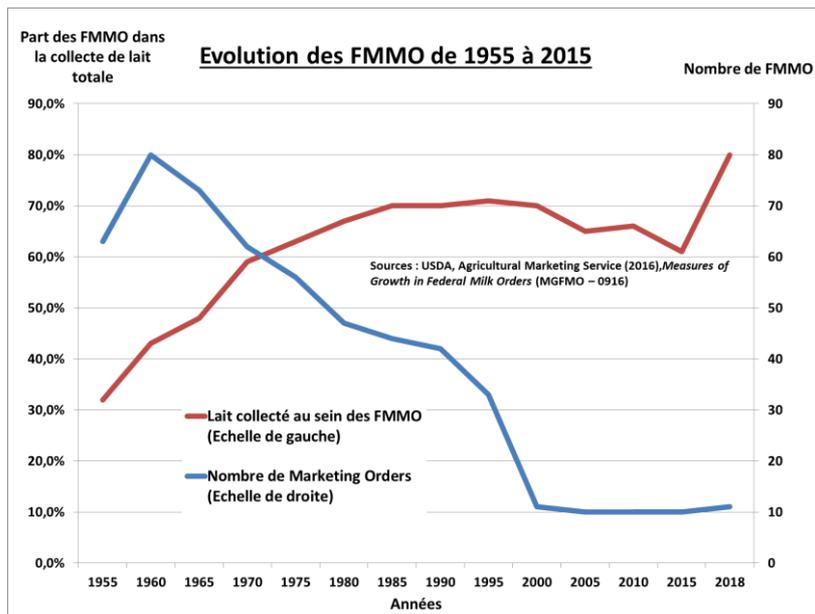


Figure 2 : Evolution of the number and importance of FMMOs in the United States

2. Creation and management of FMMOs

If FMMOs do not cover all US dairy production, it is that their implementation is at the initiative of industry players, and in particular that of farmers.

The process of creating an FMMO or amending an existing FMMO starts upon receipt of a request by the USDA. If considered admissible, this request results in the scheduling of a public hearing presided over by a judge appointed by the USDA (USDA, 2013).

Following the discussions and presentations of each party, the USDA issues a "recommended decision" followed by a "final decision". The USDA's recommendations are advisory only, as the final decision rests with the breeders.

Indeed, the last stage of the process is a referendum to which all breeders in the territory concerned are invited to participate. The formation of a new FMMO or the amendment of an existing FMMO takes place only if two-thirds of the farmers vote in favor of the change. It is interesting to note that in the case of producers organized into cooperatives, the latter may have a mandate to represent all their members.

Marketing boards remain under the authority of the federal government through a USDA-appointed administrator. The administrator of an FMMO is in charge of the control of the good functioning and has the means in particular humans to carry out the audits of the various transformers. The latter have strong obligations in terms of transparency both in terms of collection and sales, in terms of both price and quantity. In the event of a breach by a processor, the FMMO administrator may initiate civil or criminal proceedings depending on the seriousness of the misconduct.

The transparency requirements underlying the operation of marketing boards are often exemplified for the improvement they bring to the functioning of markets. This was the case, for example, with the report of the Task Force on Agricultural Markets set up at the request of the European Commissioner for Agriculture (Agricultural Markets Task Force, 2016).

Declarations are mandatory for all processors, including those who are not part of FMMOs. And the information collected is aggregated by type of products (cheddar, whole milk powder, skim milk, etc ...) and made available weekly.

Since 2010 this transparency has been enhanced through the use of an electronic system to speed up the process of transmitting information (USDA, 2011). This desire for transparency is not specific to the American dairy sector, the same reporting system exists for beef, pork and lamb.¹

¹ Cf. Electronic Code of Federal Regulations : <https://www.ecfr.gov/cgi-bin/text-idx?SID=776d5666e8abcdf592b8aa682bd18a0&node=pt7.3.59&rgn=div5>

3. Principales fonctions des FMMO

Each month, an FMMO establishes the minimum monthly price of milk for producers in the area covered. To do this, FMMOs must :

- **collect information on the quantities of different dairy products leaving the processing;**
- **calculate the minimum monthly milk price from a series of mathematical formulas that incorporate price changes for four processed dairy products;**
- **regulate the pooling between handlers.**

a. Four classes of milk depending on the use made of it

The continuous monitoring of the production of the dairies makes it possible to know their commercial positioning. This is called a product mix to define the production choices of processors, whether they are more oriented towards fresh products with high added value ("good product mix") or on industrial and undifferentiated products such as milk powder. ("Bad mix-product").

In order to have a simple and common basis of comparison, four classes of milk are defined according to the type of use that is made of them.

The four classes are:

- Class I: Liquid milk and milk drinks
- Class II: So-called "soft" dairy products (ice-creams, creams, yogurts, etc.)
- Class III: "Hard" milk products (butter, cheese)
- Class IV: Milk powders

The product mix of each processor is thus established according to the proportion of the milk that it transforms into products of each of the four classes.

The websites of each FMMO provide aggregated product mix data for the area covered. As can be seen on the map below (Figure 3), product mixes vary from one area to another.

It appears that Class I (liquid milk and milk drinks) is proportionately more important than the FMMO covers an area where the population is large and low production. Southeast FMMOs (Florida, South East or Appalaches) produce mainly milk for Class I (liquid milks), while those in Central (Upper Midwest and Central) are more positioned on products in the class. III (butter, cheese).

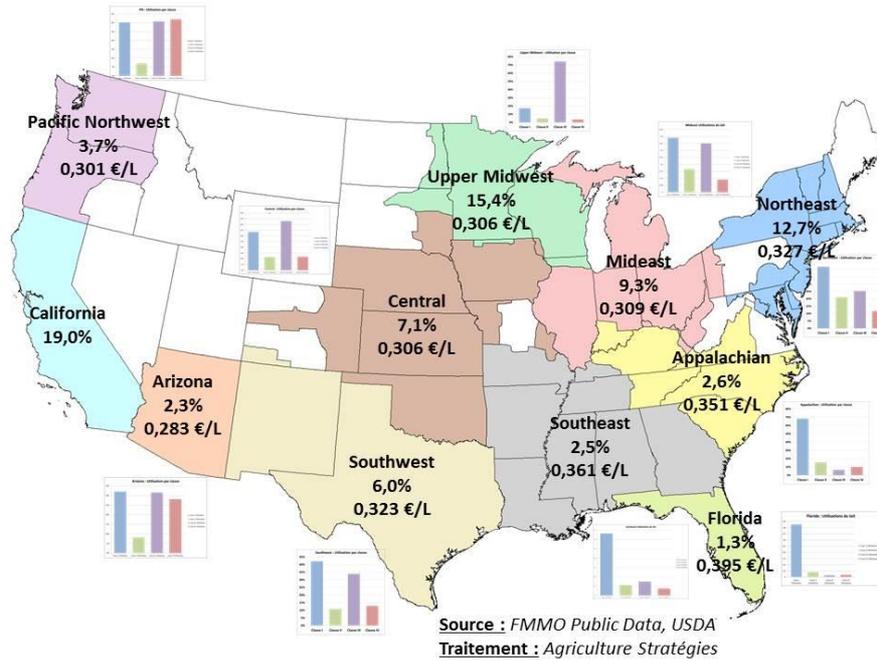


Figure 3 : Breakdown of product mix by class in each FMMO

From the information collected from FMMOs (those on California not being available in a comparable format), the average product mix can be represented in the United States (Figure 4). It appears that 40% and 37,1% of the milk are used respectively for Class III products ('hard' products - cheese and butter) and Class I (liquid milk and milk drinks). Classes II and IV each account for just over 10% of processed milk volumes.

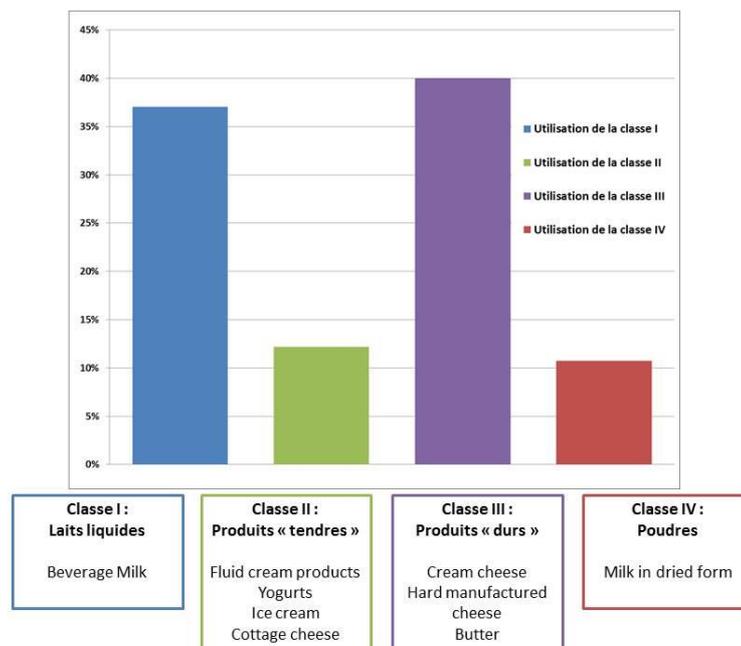


Figure 4 : Distribution of milk by class within FMMOs over the period 2007-2016

b. A milk price for each class of processed products

Prices for each class of milk are calculated using established formulas (Figure 5). These formulas have not been changed over the past decade. The legislation allows for changes but only at the discretion of the USDA and without the approval of FMMO participants (USDA, 2004).

Formules des classes

$$P_{\text{Classe I}} = (\text{Prime de loc.} + \text{Max (Advanced Class III/IV)} * 0,965 + (P_{\text{butterfat}} + \text{Prime de loc.}/100) * 3,5$$

$$P_{\text{Classe II}} = (\text{ADV}_{\text{Class IV}} + 0,70) * 0,965 + P_{\text{butterfat}} * 3,5$$

$$P_{\text{Classe III}} = (\text{ADV}_{\text{Class III}}) * 0,965 + P_{\text{butterfat}} * 3,5$$

$$P_{\text{Classe IV}} = P_{\text{non fat solids}} * 8,685 + P_{\text{butterfat}} * 3,5$$

$$P_{\text{Protein}} = (P_{\text{cheese}} - 0,2003) * 1,383 + (((P_{\text{cheese}} - 0,2003) * 1,572) - P_{\text{butterfat}} * 0,9) * 1,17$$

$$P_{\text{Non Fat Solids}} = (P_{\text{nonfat dry milk}} - 0,1678) * 0,99$$

$$P_{\text{Butterfat}} = (P_{\text{butter}} - 0,1715) * 1,211$$

$$P_{\text{Other Solids}} = (P_{\text{dry whey}} - 0,1991) * 1,03$$

$$P_{\text{Adv Class IV}} = P_{\text{non fat solids}} * 9$$

$$P_{\text{Adv Class III}} = (P_{\text{Protein}} * 3,1) + (P_{\text{other solids}} * 5,9)$$

Figure 5 : Formules régissant le calcul de prix pour chaque classe

An examination of the price formulas makes it possible to understand the logic underlying their definition. For each class, there are four constituent elements in different proportions, namely: protein (protein), fat (butterfat), non-fat solids (non-fat solids) and other solids (others solids). And, each of these constituent elements is itself linked to the processed dairy product or products so as to rely on the price quotation of the latter.

Thus the price of the 'protein' element depends on the price of cheddar (in positive) and butter (in negative). The price of the 'fat' element depends on the price of the butter. The price of the 'non-fat solids' element depends on the price of skimmed milk powder. The price of the 'others solids' element is a function of the price of whey powder.

In addition to the prices of the four processed dairy products, the formulas also show a location bonus, which is defined to take into account, within the FMMO, the distance of production from the main consumption centers to compensate for the costs of production. transport of milk that remain the responsibility of the farmer (Chite, 2006). This location bonus, however, must not be confused with another premium that is paid in addition to the minimum price to compensate for the milk of FMMOs furthest away from the main centers of consumption.

Figure 6 below shows the relationships between the variables. Above are the four processed dairy products; in the middle the four constituent elements; and down the four classes of milk according to the types of valuations. The minimum monthly price for milk is derived from the

average of the milk prices of each grade weighted by quantity; this price is called "uniform price" or "blend price".

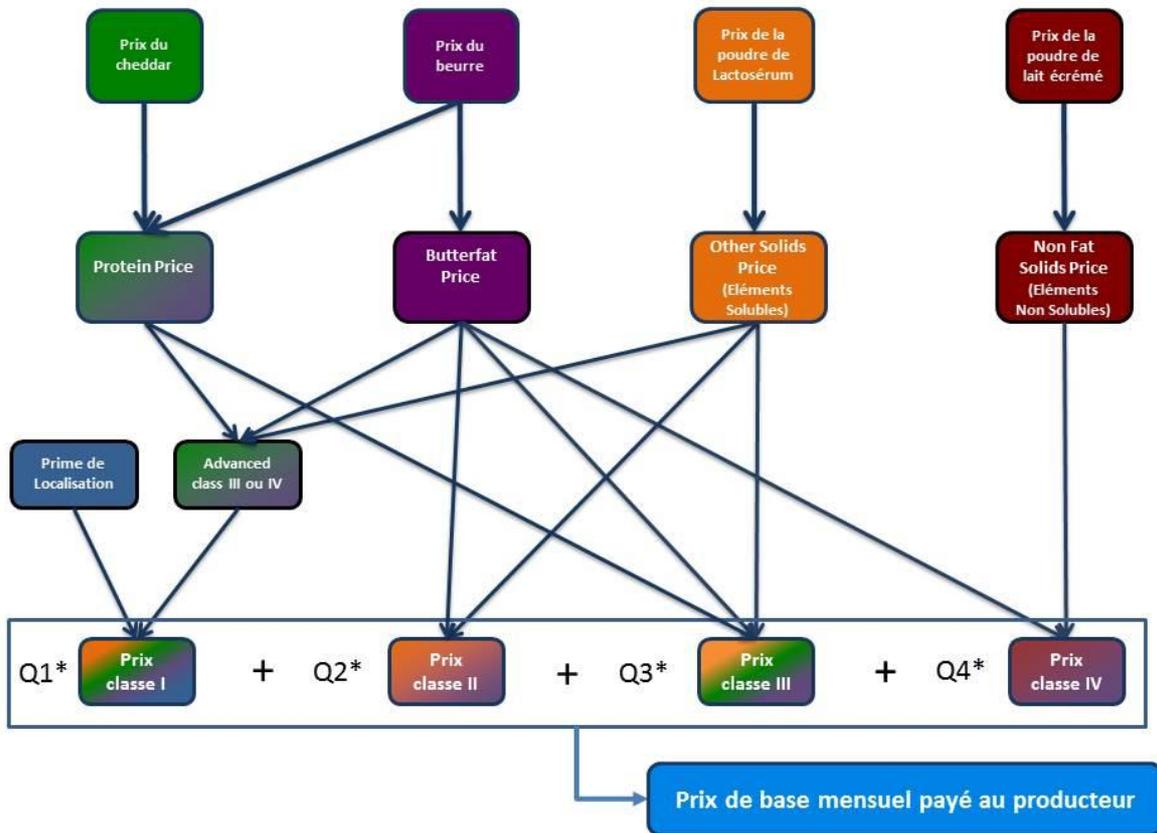


Figure 6 : Diagram showing the method of calculating prices for each class

The variations in the minimum milk price set by the FMMO depend on the prices of the four processed products cheddar, butter, skim milk powder and whey powder. It appears that the price of milk does not fluctuate according to the price of consumer products (FMP), those that are accessible to the final consumer. It is thus a question of a sharing of the value between the production and the first transformation, the prices at the consumption are not integrated in the calculation of the price.

The price formulas are complex and, at first glance, do not seem to give the impression of reacting in the same way to an upward or downward price variation: we note in particular the presence of Max function (X, Y). However, the sensitivity analysis (in Annex 1) shows that a rise or fall in the overall price of the four processed products results in a substantially similar increase in the minimum price of milk.

In addition, as shown in Figure 7, the price of cheese seems to have the greatest weight in the formation of the price of milk: all other things being equal, a rise or fall in the price of cheddar of 1% results by a rise or fall in the price of milk of about 0.75%. Conversely, the effect of changes in the price of skim milk powder and butter on the price of milk is highly damped: a 20% change in the price of these products translates into a 3% change in the minimum price of milk.

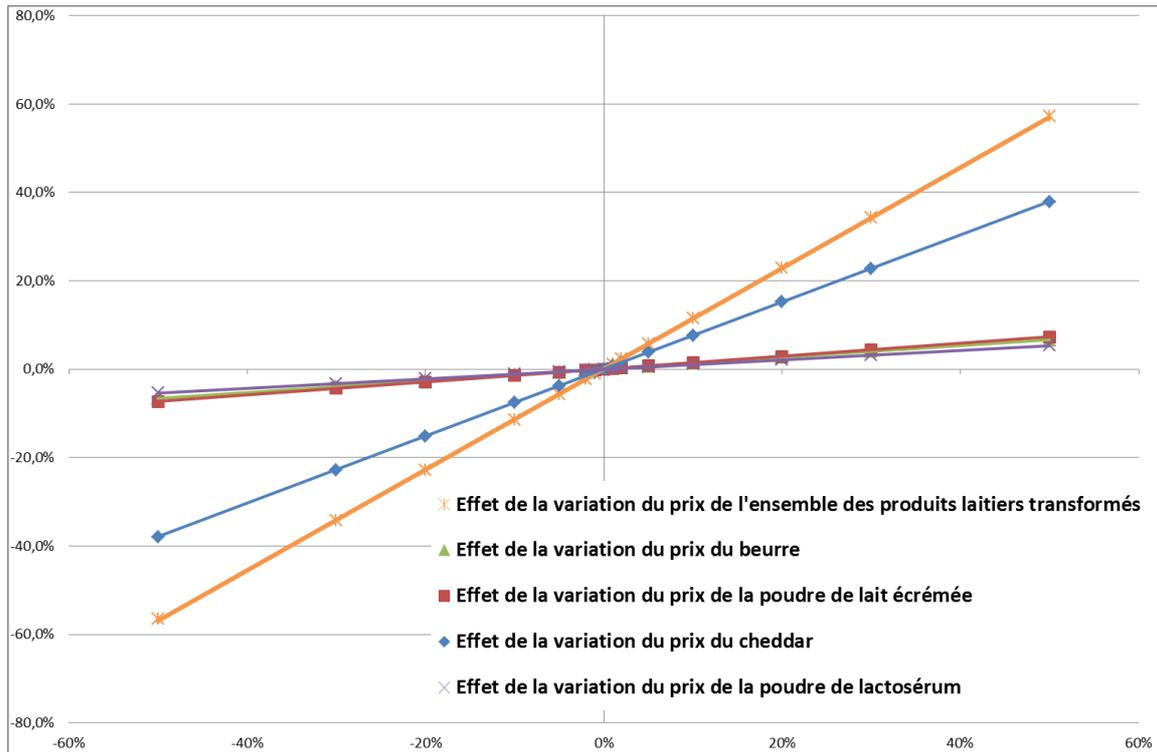


Figure 7 : Result of the sensitivity analysis: Effect of a change in the price of processed milk products on the minimum price

Figure 8 shows the series of the four classes of milk and the minimum price (uniform price) between 2000 and 2016. It is noted that the price of class I is systematically higher than the other three classes and therefore the minimum price which constitutes the weighted average. Over the period, the price of Class I milk is on average higher by \$ 0.05 / L at the minimum price.

It also appears that there is no established order between the prices of the other three classes, which are generally quite close to each other and at a level below the average price (less than \$ 0.02 / liter for Classes II and III, and \$ 0.03 / liter for Class IV). Class I prices for liquid milks and other beverages improve the average value.

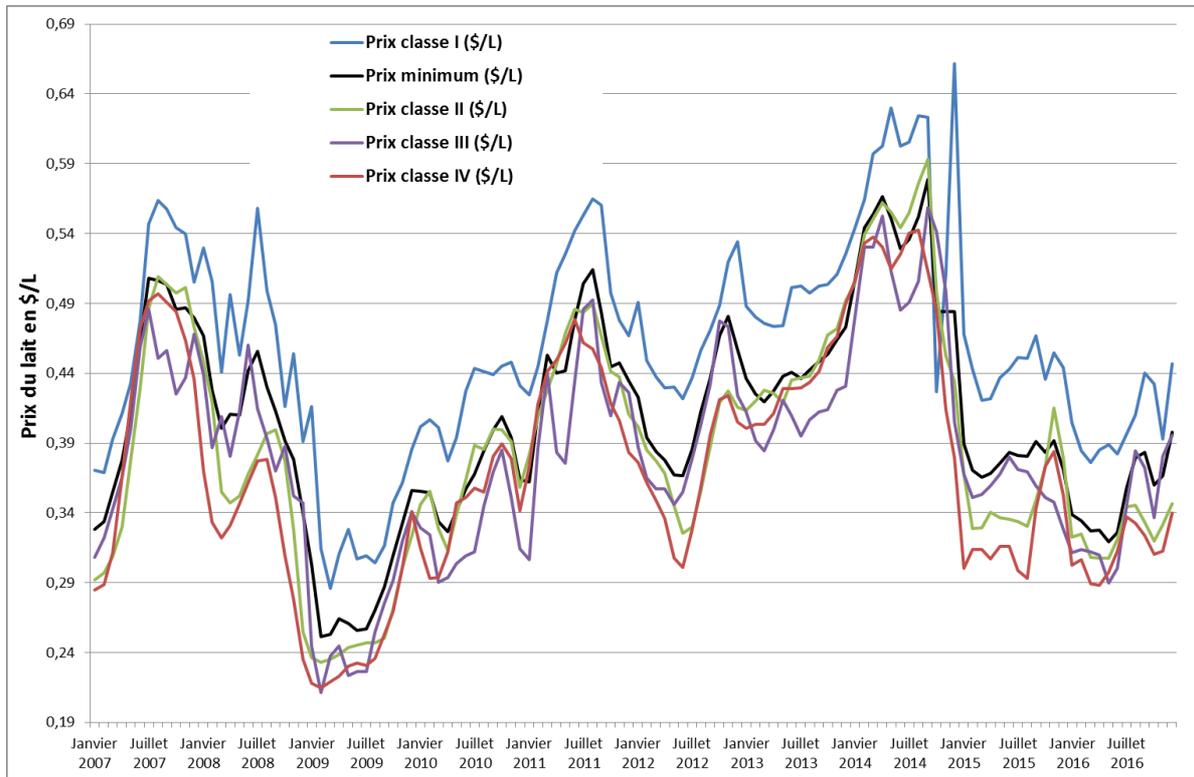


Figure 8 : Price for each class of milk and minimum price

Beyond their respective levels, the prices of the different classes of milk undergo fairly similar evolutions over the period. The price of class I seems slightly less volatile than other classes: over the period, its coefficient of variation is 0.197 against 0.24 to 0.25 for other classes.

Finally, we draw attention to the fact that the minimum price (or uniform price) is not the price that the farmers receive, since supplements relating to the quality of the milk or the distance from the American consumption centers are also to consider. The price that the farmers receive is called "mailbox price" and is slightly higher than the minimum price of about 1.2% over the period. In the publications of the European milk observatory in particular, it is the price of class III which is used to represent the price level of milk in the United States. In this way, it is an underestimate of about 8.7% of the price received by American farmers.

c. Pooling between handlers

Each FMMO sets the minimum monthly price for milk from the product mix in its exercise area. Processors must respect this minimum price, but each of them has a different product mix that can move away from the average mix. A processor with a bad product mix could be in trouble if he had to buy milk at the average product mix in the area. Above all, it would not be in the same competitive conditions as a processor of another FMMO with different average mix-product.

Thus, if the minimum price is common to all producers, the actual purchase prices for processors vary from one processor to another to reflect their respective market positioning. Concretely, equalization is organized between the processors: those with the best product mix finance those who have the least valued opportunities.

The FMMOs regulate the equalization between the transformers. This equalization allows each processor to pay the minimum price to the producers, but to receive or be taken from a transfer so that the actual purchase price of the milk differs according to the product mix of each processor.

FMMOs structure the sharing of value-added: the minimum price of milk is calculated on the basis of all valuations and equalization allows processors to buy milk according to their product mix.

The diagram below (Figure 9) illustrates equalization or "pooling" in English. The additional value from Class I milk is divided into Class II, III and IV. Processors with a product mix greater than the average product mix contribute to the Equalization Fund so that the price paid to producers takes into account all valuations including the best ones. Equalization makes it possible not to destabilize processors with less good product mixes and ensures equal competition between different FMMO processors, as it is the same price formula at work in all FMMOs.

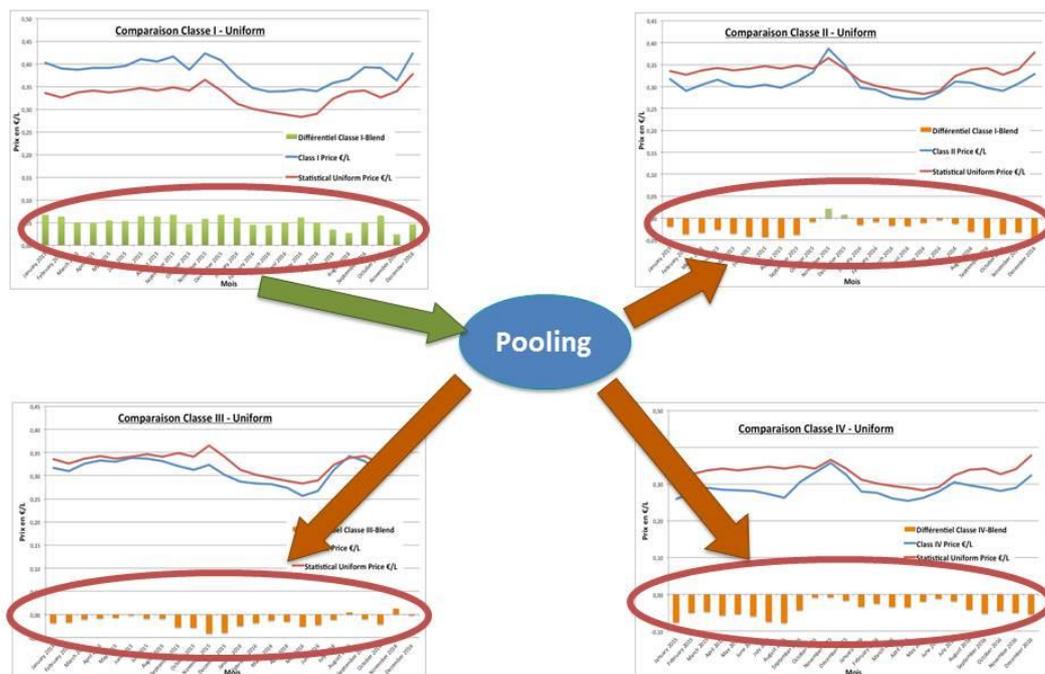


Figure 9 : Scheme representing Equalization within FMMOs

There is no public data on cash transfers between processors in Equalization. They are not made directly between the interested parties, but transit via a fund managed by the FMMO, the producer settlement fund. According to experts, it is estimated that transfers amount to between 10% and 15% of the total value of milk collected within FMMOs..

4. California has just created its FMMO

California has a specific milk price regulation system whose bases also date from the 1930s. Its central principle: individual references on the best valorization and equalization on the other 4 milk classes (there are 5 classes in all).

Producers hold individual quotas which guarantee a high price on part of their production, this quantity globally reflects the consumption of fluid milk. Beyond this quantity, production received a lower price. The management of the device was ensured by the California Milk Marketing Order (CMMO), whose principles therefore differed in part from FMMOs (USDA, 2004).

Considering that the California system had become less advantageous than the federal system, California milk producers and their co-operatives (California Dairy Inc., Dairy Farmers of America and Land O'Lakes) began the process of setting up an FMMO in 2015.

The process was concluded by the vote of the producers last June and the new rules will be at work from autumn 2018. The transition will lead to merge two classes of milk to converge to the current regime. Californian farmers have nevertheless managed to negotiate the maintenance of individual historical references offering them a better price on part of their production (USDA, 2018). The new Californian FMMO will retain a singularity compared to others.

II. The transposition of FMMOs in France

1. Methodology

From the information collected to understand the functioning of the FMMOs in the United States, we sought to transpose the price formulas to the French scale. The objective is to rebuild the price that would have been paid to producers if a system identical to that of the FMMOs was set up in France.

To do this, we based ourselves on the weekly dairy product prices (sources Agreste and European Milk Observatory) as well as the data characterizing the product mix of the French dairy processing (source FranceAgriMer).

We have reconstructed the 4 classes of products from the main dairy products made in France. The distribution is explained in the following table (Figure 10).

Produits Français	Classe	Produits Américains
Laits pasteurisés Laits stérilisés Lait UHT Lait aromatisé Lait infantile	Classe I « Laits liquides »	Beverage Milks
Fromages blancs Petits Suisses Yaourts et lait fermentés Desserts lactés frais	Classe II « Produits frais/ultra-frais »	Fluid cream products Yogurts Ice cream Cottage cheese
Fromages Beurre	Classe III « Fromages/beurre »	Cream cheese Hard manufactured cheese Butter
Poudre de lait écrémé Poudre grasses Poudre de lactosérum	Classe IV « Poudres »	Milk in dried form

Figure 10: Table showing the distribution of products in each class

To establish the French product mix, we used the results of the 2014 annual dairy survey synthesized by FranceAgriMer (FranceAgriMer, 2016). We assumed that this product mix was constant over the period, which reduces the price differential resulting from the application of the FMMO regime to France, since the product mix deteriorated over the period in a context of rising production.

In addition, to convert the different dairy products into milk equivalents, we used the conversion coefficients from the Price and Margins Observatory (Depeyrot, 2011).

For prices, we have taken the official French quotations developed by ATLA for skimmed milk powder and whey powder and by FranceAgriMer for butter. For cheese, we have substituted the cheddar rating for that of Emmentaler because Emmental is a hard cheese with a composition close enough to Cheddar and the listing frequency (Eurostat) of Emmental cheese is satisfactory.

2. Main results

From the French data, the application of the current price formulas in the United States allows us to calculate what would have been the price of milk if the formation of milk prices was governed by a marketing board. the French scale. In this simulation, we assumed a zero location premium.

The French product mix differs in part from the American product mix. In France, class III ("hard" products - butter, cheese) represents 49.9% of milk uses (against 40% in the USA). Class I (liquid milk and milk drinks), which is very important in the United States, accounts for only 9.7% of volumes in France. Class II ("soft" products - ice cream, cream, yogurts, etc.) is comparable with 10.8% in France against 12.2% in the United States. In contrast, Class IV (milk powders) peaks at 29.6% in France against 10.7% off the Atlantic.

The green curve in Figure 11 represents the price of milk production in France recalculated over the period 2007-2016 from US formulas. The differential with the blue curve, which reflects the average price actually received by French farmers, is represented in the form of batonets at the base of the graph. Over the period 2007-2016, under the above assumptions, the price of milk paid in France would have been 13% higher, ie € 43 / 1000L.

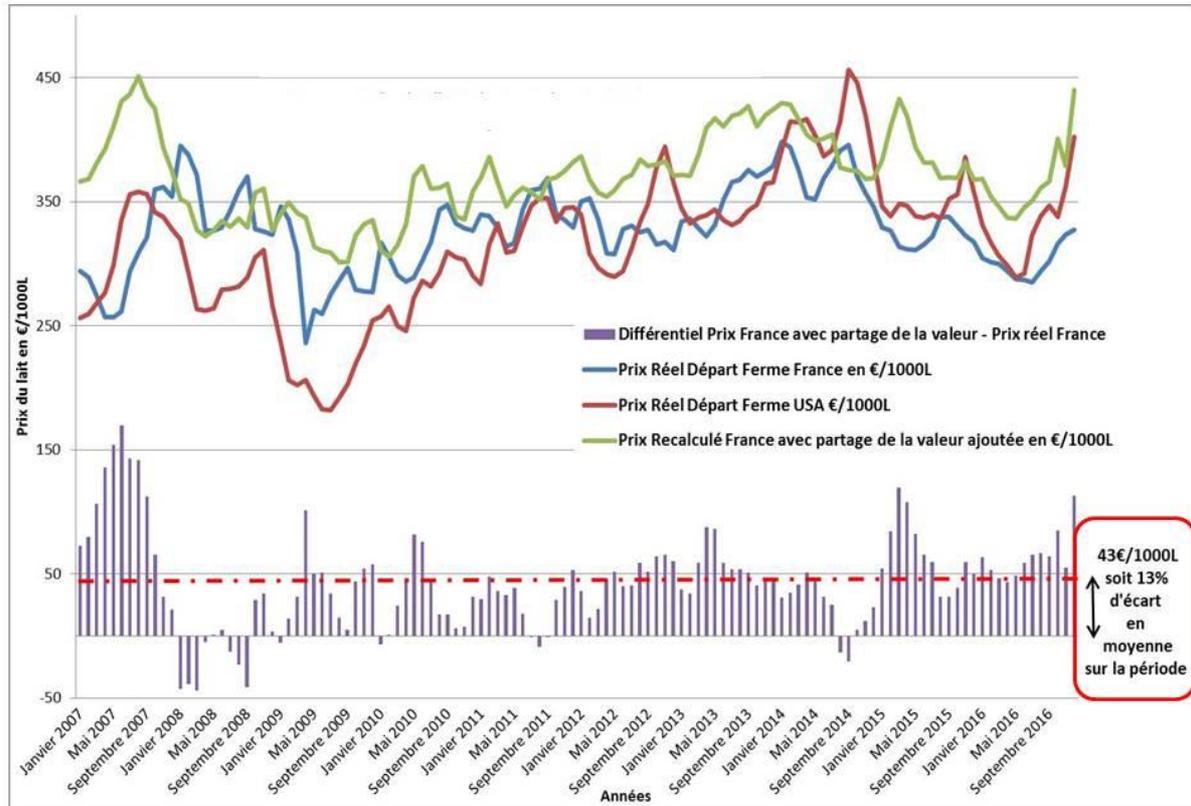


Figure 11: French real price, American mailbox price and simulated minimum price in France

In addition to the average value differential, the coefficients of variation show that the formula at the base of the recalculated price is more reactive (coefficient of variation of 0.1886) than the series of real prices (coefficient of variation of 0.0992). This reflects a better transmission of increases and decreases within the sector, which is a guarantee of greater efficiency in the coordination of the entire sector.

The price evolution of the different classes makes it possible to understand the important weight of cheese in the formation of the recalculated price (Figure 12). First of all, it appears that Class I and Class III prices merge because of the cancellation of the location premium and the sufficiently high level of the emmental price which gives an advantage to 'Advanced Class III' in the formula.

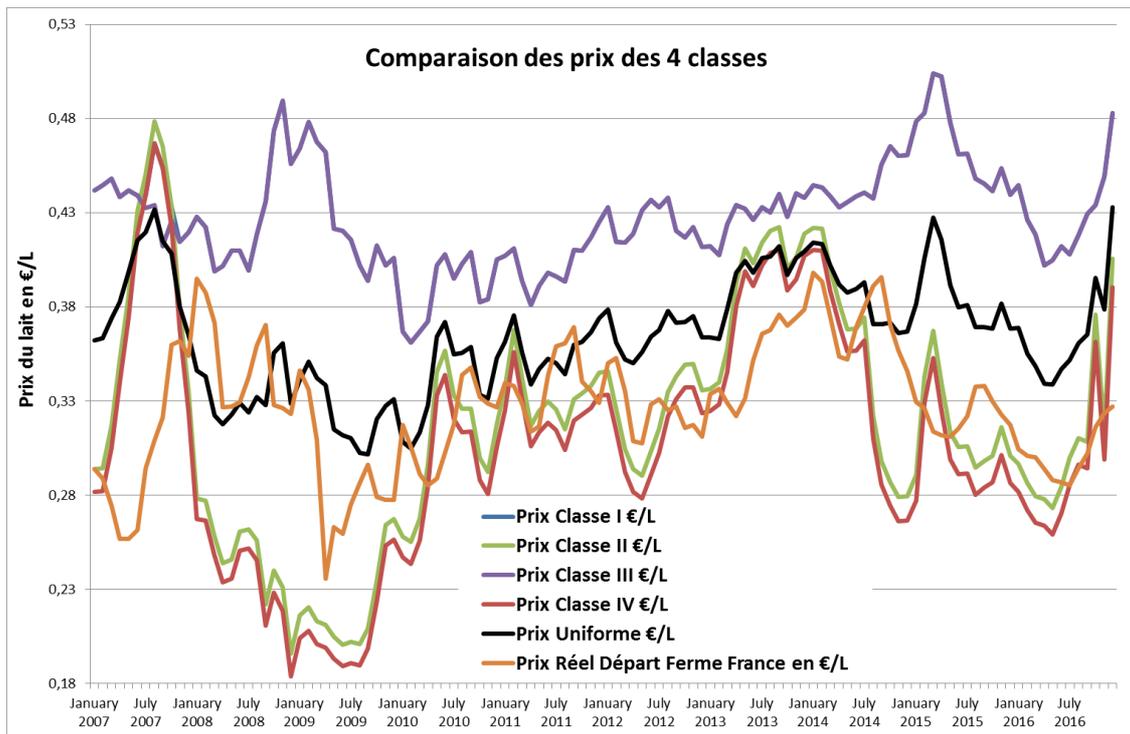


Figure 12 : Price comparison of the 4 product classes in our simulation

The recalculated minimum price is therefore pulled up by the price of classes I and III, which together account for nearly 59.6% of French milk. Conversely, lower and more variable Class II and IV prices have less weight in our simulation than they seem to have in reality, which is understandable in the case of powder (Class IV) but seems paradoxical enough for class II which includes yogurts and other ultra-fresh products.

Thus, the main explanatory hypothesis with respect to the differential observed between the recalculated price and the real price would be that the US price formula gives a significant weight to cheese, which represents nearly 50% of the valuations in France. The price of emmental cheese was on average 6.8% higher than the cheddar over the period, this difference can not in itself explain the 13% difference between the recalculated price and the observed price.

But, in fine, it is not so much the price differential obtained via this simulation that matters in itself. The formula, as provided for in US legislation, may evolve to reflect new compromises. More than its in-depth analysis, it is its very existence that questions: why did the United States choose to have for more than 80 years this institutionalized formation of milk prices at the heart of the regulation of this sector? What benefits do they derive? And, given the difficulties encountered in France, where improving the sharing of value added is central to the dairy industry's discussions, what lessons should be drawn from what should be called the US policy of sharing the value chain? the value of milk in the perspective of the next CAP? These are the main questions we deal with in the next section.

III. Improving the organization of milk production in France: why? how?

1. US policy lessons and transaction cost theory

In terms of agricultural policy, the United States is recognized for its pragmatism and interventionism. The dairy sector is no exception to the rule and although FMMOs are one of the main components of the regulation of this sector, it is not the only one.

Producers have access to specific direct aids that currently take the form of variable aids based on the difference between the price of milk and a standardized cost of production. The Dairy Production Margin Protection Program, or DP-MPP, is sometimes misrepresented as insurance because producers can choose their level of coverage, but it is counter-cyclical aid paid directly by the state (Grandjean, Courleux, 2014).

In addition to structural programs, emergency measures can be quickly triggered in the event of a crisis. In the summer of 2018, of the \$ 12 billion announced by President Trump, \$ 127 million was mobilized for direct aid to dairy farmers and \$ 88 million was allocated to the food aid program to purchase additional dairy products². Domestic food aid is an important outlet for US production and is also used as a market outlet for a crisis, as was the case for cheese in 2016³.

With the FMMOs, the United States goes beyond the only management of the consequences of the dysfunctions of the agricultural markets: they directly attack the cause of one of the main problems of the sectors where the formation of the prices can not be spontaneous of the fact of market structure and product characteristics. This is the case of the dairy industry: milk is a heavy, perishable product produced throughout the year, which requires that it must be collected and processed every 2 to 3 days. There is therefore a strong mutual economic dependence between the link of production and that of transformation.

In addition, the existence of economies of scale much more important in the processing than in the production implies that a dairy will collect a large number of producers on a close radius, the latter thus have only exceptionally an alternative in terms of business opportunity⁴. Reciprocal economic dependence therefore doubles as an imbalance in the bargaining power. We are talking about a captive market situation (Dedieu, Courleux, 2009) or a natural monopoly (Boussard, 2017).

The economic theory of transaction costs also provides important keys to understanding bilateral dependency situations (Williamson, Masten, 1995). According to the latter, when a transaction involves the mobilization of "specific assets" in both parties, the economic relationship between the two parties is not stable in an uncertain and risky environment because all the scenarios cannot be resolved during the initial commitment.

² <http://www.agriculture-strategies.eu/2018/09/guerre-commerciale-us-chine-le-soja-et-la-viande-de-porc-au-coeur-des-12-milliards-daides-annonces-par-trump/>

³ http://www.momagri.org/FR/articles/Crise-laitiere-le-pragmatisme-made-in-USA_1787.html

⁴ Et ce d'autant que des accords de collecte existent entre laiteries

In addition, an unequal distribution of bargaining power will result in the dominant capture of "quasi-rent", which will be all the greater as the ability to mobilize the factors of production in another relationship will be low (cost of low opportunity). And the more specific assets are, the lower the opportunity cost. Let's illustrate the example of dairy farming equipment, the ability to mobilize them for another production is very low.

To limit the opportunistic behavior of a dominant actor who, by taking the quasi-rent, can, in a way, go so far as to saw the branch on which he sits, the economic theory of transaction costs indicates that "forms can emerge. hybrid organizations "where the interests of both parties will be taken into account in order to maintain the long-term relationship and avoid the disinvestment of the dominated. These "hybrid forms of organization" can take different forms, from peer regulation to public regulation measures. The study of "hybrid organizational forms" constitutes an important field of investigation for economists working in this framework of analysis, and some of them even see in their emergence a responsibility of the public authorities (Watanabe, Zylbersztajn, 2014)

In the absence of "hybrid organizational forms", the economic relationship will be unstable: it will disappear or evolve into a form of hierarchical integration, that is, a relationship of subordination will be established between the two parties. In agriculture, integration occurs either upstream, this corresponds to the collection and processing cooperatives, or downstream when the actors of processing or distribution gradually take control of their suppliers. The excerpt presented in the box below summarizes the main contributions of transaction cost theory.

- The establishment of contracts is "a way of structuring negotiations in order to avoid, as far as possible, opportunistic behavior. The problem then for the contracting parties is to choose a structure that encourages the development of quasi-rent and the adjustments necessary for its maintenance (seeking flexibility) but which discourages efforts to reduce quasi-rent, seeking only to influence its redistribution through opportunistic behaviors "[...]
- "Using the contract to try to induce cooperative behavior by a non-cooperative actor is a waste of time" [...]
- "When the contract does not achieve an adequate level of flexibility and security in the relationship then the ultimate solution is the integration and replacement of a hybrid relationship by a subordinate relationship, achieving both. objectives at the price of a fall in incentives "

Box 1 : Main lessons of transaction cost theory (Saussier, Yvrande-Billon, 2007)

The American dairy policy, and in particular its marketing boards, offers an interesting illustration for the economic theory of transaction costs. The economic dependence between production and processing is so strong for dairy farming that price formation can not take place spontaneously. In other words, we will never see two or three milk pickup trucks race on the country roads to offer different prices to the producer each time the milk is collected. As a result, the United States has chosen to institutionalize price formation to avoid opportunistic behavior that would have led to sub-optimal forms of integration and concentration in terms of incentives and investment.

In addition to the United States, it should be noted that through joint marketing plans, each province in Canada has a similar system to ensure equalization and value sharing since 1956 (Royer, 2009). A regulator - the *régie* - has a strong power of coercion to regulate the relations between the producers' offices and the buyers and to ensure the good respect of the contractual commitments (Royer, Gouin, 2016).

And in the end, the establishment of giant cooperatives in quasi-monopoly situation at the national level is also a way to overcome the problems of coordination between the links of production and distribution. Whether in Denmark with Arla Foods, in the Netherlands with Friesland Campina or in New Zealand with Fonterra, the sharing of value and the equalization between the different valuations are carried out internally in these cooperatives.

2. Producers' organization: the French situation

The main dairy product exporting countries thus have equalization mechanisms of two kinds: either public policy or internally developed by cooperatives that integrate the links of production and processing. In both cases, the price paid to the producer depends on all valuations. In France, dairy cooperatives collect 55% and convert 45% of the production, and they are on product mixes on average less good than their private competitors. In the absence of spontaneous price formation and in the absence of any specific alternative provision, French producers suffer from a competitive organizational disadvantage. Milk prices in France are not established on as good a basis as their main competitors, with the same value being equally unfavorable.

Historically, the CAP intervention prices for butter and powder were a floor for the price of milk. With the drop in minimum prices in the mid-2010s, the butter-powder valuation price was lowered to a level well below production costs. To mitigate the decline of this safety net, industry players have sought to establish recommendations for changes in the price of milk within the interprofessional sector. But in the absence of equalization mechanisms to take into account the diversity of the positions of the processors, the negotiations on this recommendation inevitably hit the risk of putting the manufacturers in difficulty at the wrong product mix. And, in the end, the interprofessional recommendations were removed in 2009 at the request of the Competition Authority.

a. An economic domination reinforced by "contractualisation"

Since then, the problem has remained as it is. The "contracting" policy in the dairy sector has not solved it. Indeed, rather than seeking to massify the offer in Producer Organizations (POs) sufficiently large at the scale of a basin (we speak of horizontal POs), the "contractualisation" initially obliged the non-cooperative producers to enter into a contract with their dairy, and then form processor-specific POs (referred to as vertical POs) that do not hold production (PO without transfer of ownership) at any time.

The model of POs without transfer of ownership has been promoted for want of something better, so that the POs supposed to negotiate do not even have the argument, for example, to propose a drop in delivery in the face of a price deemed unsatisfactory. Presented as an alternative to the end of milk quotas, "contracting" has led to increasing the economic dependence of producers who, with the end of quotas, could not even rely on the global limitation of production to improve the sharing of added value.

That being said, it should be noted that this evolution is not the consequence of community decisions but of national choices. The 2010 Milk Package authorized the creation of OPs without a transfer of ownership, each of which could include up to 30% of French production. Moreover, it was not until April 2012 that the FO decree was published when the decree on the obligation to offer a contract was already in operation. Especially the threshold of recognition of POs was set at 60 million liters, while Brussels imposed as a ceiling a level 100 times higher. Finally, in the framework of the application of the 2013 CAP, France has chosen not to use the measure of the second pillar of the CAP, which nevertheless made it possible to finance the formation of POs. In short, the government has so far not favored the creation of POs strong enough to improve the sharing of value added and institutionalize price formation, and we can even say that almost everything has been done to that it is not.

The balance sheet of the "contractualisation" is therefore rather weak. A contract has never rebalanced an unbalanced business relationship on its own. Without grouping the producers, the economic domination they undergo has increased. In spite of all their good will, the farmers at the head of the POs can not do otherwise than to be imposed a price to take or to leave. It would be even risky to talk about negotiation: their bargaining power tends to zero. The agreements are even sometimes denounced unilaterally by buyers without possibility of dispute given the economic domination: each farmer opens the envelope of his payroll milk on the 15th of the month for the production of the previous month without any certainty on what he will discover there. There can normally be no commercial negotiation without discussing both price and quantity, this is the case in this sector!

Information asymmetry also characterizes the bargaining powers: while processors have all the information on the costs of producing milk at their fingertips, the leaders of FO often have nothing to say about product mix of their unique buyer. In the end, for the part of the production that is not collected by cooperatives, that is about 45% of French production, there are today about 60 POs essentially specific to a buyer, and not having the property of the merchandise (Lambaré, You, Dervillé, 2016).

b. Trade relations from another age

The archaic nature of the commercial relations here depicted covers in fact a fairly large variability in which certain industrial groups are more conciliatory and constructive towards their producers than others. But overall, strong bargaining power, private processors have the elbow room to impose a price level that corresponds to what the main cooperatives in the sector can offer their members, given their product mix. The formation of milk prices in France can be summed up as follows: the base is the product mix of the cooperatives and we add or add a few tenths of a penny more to keep a hold on our suppliers. We understand why some producers do not hesitate to talk about feudalism or slavery to characterize these relationships⁵.

If the product mix of cooperatives is less good it is mainly because they are regularly led to resume the collection of volumes remained on the floor during the restructuring of processing, especially in low density areas. On the other hand, private processors have been able to develop upscale strategies on well-valued brands. The creation of value thus made is not open to criticism in itself, it is the sharing of this value that is debatable. A figure can illustrate this

⁵ Cf. interview de Dominique Chargé dans les Echos : https://www.lesechos.fr/20/09/2016/LesEchos/22280-080-ECH_dominique-charge----les-producteurs-doivent-sortir-de-l-asservissement-aux-entreprises--.htm

situation: in France for 1000 liters of milk, the transformation generates a turnover of more than 1300 € against approximately 700 € in Germany (according to ESANE and ELEC 2018). However, the average milk prices in France and Germany are not significantly different, whereas through the development of methanation, the German electricity consumer subsidizes milk producers.

The announcement by some cooperatives of a desire to improve their product mix can only be laudable, as it would increase the added value distributed to their members but also, given the formation of milk prices "to French" among producers of POs delivering to private processors. However, it is not easy and may be counter-squared by future drop-outs already announced by some private processors who want to focus on the heart of their mix-product.

We understand that the price of milk in France is very dependent on the prices of industrial products, butter and powder, which are found in the product mix of cooperatives and which also serve as a reference in negotiations with large retailers. This implies another paradox because of the seasonal adjustment of production in France, which is needed to continuously supply factories and shelves with fresh produce: this seasonal adjustment has a cost for producers, whereas the main competitors for powder and butter New Zealand or Ireland have highly seasonal productions. Regularity of supply should be considered as a service to be paid to producers. The same is true for all the qualitative differentiations (appellation of origin, grazing milk, no GMO, etc.) for which the question of value sharing is only very sporadically posed in the negotiations.

c. Un déclin annoncé

The nature of trade relations and the economic dominance of co-operatives and their members largely explain the sector's sluggishness. The low levels of milk prices recorded over the past four years are all the more complicated for producers to cope with a period of collective euphoria where the prospect of winning new export markets and the end of quotas dairy farmers have encouraged investment and increased production. Disillusion is important for dairy farmers and has important consequences for the motivation required for demanding production in times of strain, technical skills and capital.

With an average production cost of around € 400 by integrating the CAP aid (see the latest estimate by Idele for 2016⁶) and an average price that has not exceeded € 370 since 2014⁷, the prospect of price rises in 2019 will be difficult to stem the announced decline of the French dairy industry. The ability to endure low labor and capital remuneration explains the short-term resilience of farms, but it does not prevent the alteration of the social reproduction capacity of family farming, which remains the most productive form of productive organization. effective in breeding. Whereas until then the volumes released by the sellers were recovered by those who continued to increase their production, it seems that even in the most dynamic regions, the trend is now towards a decline in production.

The decline in the number of dairy farms over the last decade seems to confirm the demographic approaches of dairy farms developed by Christophe Perrot and in particular that of a black scenario with 20,000 farms in 2035 (Perrot, 2010). Given the structural limits to herd

⁶ Voir IDELE, 2016, « De MILC aux coût de production et prix de revient du lait de vache à partir du RICA », <http://idele.fr/services/outils/milc/de-milc-aux-cout-de-production-et-prix-de-revient-du-lait-de-vache-a-partir-du-rica.html>

⁷ Source : European Milk Market Observatory

development (specifications, grazing systems, neighborhood pressure, etc.), but also the significant gap in terms of investment, workload, management of breeding and Since the dairy herds represent more than 80-100 cows, it seems unlikely that the average production will exceed 800,000 liters. The trend scenario is that of a 30% drop in French milk production by 2030. The human factor therefore seems to be becoming the limiting factor for milk production in France (as analyzed by Philippe Faverdin in 2013⁸).

3. Prepare the next CAP reform

Despite its many strengths, milk production in France suffers from a lack of organization of its producers. Having a value-added mechanism like the one in place in the United States could alleviate some of the current difficulties, but would require a significant change in the current framework of the Common Agricultural Policy. This is not to be excluded, but implies that the already better-organized Member States agree to deny their competitive advantage.

It therefore seems more relevant to look at the levers that could allow a reorganization of producers. And, it is clear that the Commission's proposals for the 2020 CAP offer interesting prospects. Indeed, it proposes to extend to all sectors the logic of "sectoral interventions".

Already at work for the fruit and vegetable and winegrowing sector, the "sectoral interventions" make it possible to encourage the constitution and to finance POs (most often cooperatives) to carry out various missions like their actions of R & D, prevention and risk management, or production planning and production adjustment on demand. In the current state of regulation, POs must propose and implement operational programs valid for 3 to 7 years that allow them to finance up to 50% of the selected shares within the limit of 5% of the value of the marketed products. The Commission has proposed a ceiling of 3% of the first pillar for new sectors, but this ceiling could change during the negotiations which are likely to continue beyond the current term of office.

A strategic choice for cooperatives

Given its economic importance and its current level of under-organization, there is no doubt that the dairy sector would be a legitimate candidate for the extension of "sectoral interventions" in France. This political impulse for a reorganization of the sector accompanied by the CAP could hardly not affect the French dairy cooperatives, which during the "contractualization" were kept at a distance.

With the next CAP, a strategic and structuring alternative for several decades will then be presented for dairy cooperatives:

- Or, they will decide to take the bull by the horns and organize, by homogeneous territorial entity, their rapprochement with the existing POs so as to gradually integrate the producers of the latter as co-operators. They will be able to crush their structural costs on a larger volume and above all they will be able to negotiate the supply contracts of the factories of the other transformers present on their territory so as to operate an

⁸ Chotteau Philippe, Trégaro Yves, Faverdin Philippe, 2013, « *Débat : Productions et filières animales : Enjeux et perspectives* », NESE n° 37, pp. 157-184, <http://agreste.agriculture.gouv.fr/publications/notes-et-etudes-socio-economiques/article/debat-productions-et-filieres>

intelligent equalization as in the other exporting countries. The key is to share the added value more accurately within the sector with all producers on an equal footing;

- Or, POs will be formed within the cooperatives and these POs will be structured in Producer Organization Association (PDO) with existing vertical POs. These structures will be supported financially for production planning actions and will pilot the sharing of added value in their negotiations with the various buyers, including cooperatives which will then specialize in their processing activities, as is the case in the United States.

In both cases, we would come out of the current situation where, on the one hand, a half of producers is well organized in cooperatives with average milk valuations, and on the other half of barely organized producers. in POs with no real bargaining power over highly placed processors in higher value-added segments.

The participation of a producer in a PO or the constitution of sufficiently large OPs and PDOs can not be imposed. However, the reorganization could also be stimulated by the conditionality of all or part of the aid coupled with the dairy cow to participation in a PO. The raising of recognition thresholds of POs is also an important lever available to the public authorities to accompany the reorganization.

The reorganization does not concern all the production. Cheese products under Protected Designation of Origin already have the possibility, through Article 150 of the CMO Regulation, of setting up a supply management regime through interprofessional organizations which enable them to achieve value-sharing, balanced and specific to their production. In addition, certain players already well organized in homogeneous territories and on specific markets will not wish to engage in the reorganization movement. One can thus consider that the movement of reorganization should concern between 80 and 90% of the French production.

The last parameter to discuss is the number of entities to which the reorganization could result. It will obviously depend on the strategic choice of existing cooperatives. But, if it is to be able to sufficiently mass supply to rebalance the market power within the sector, it can be argued that the number of entities bringing together the producers for 80 to 90% of the production should be between 4 and 8 nationally.

But in the end these orders of magnitude are to be in the background. It is the mobilization of all dairy farmers that matters, whether they are also members or leaders of trade union or economic structures. Preparing now the French application of the post-2020 CAP is the major challenge to build the future of the French dairy sector by 2030.

Dairy producers must be at the heart of managing volumes and sharing value added within the sector to ensure a first level of market regulation. If this evolution is necessary, it will not be enough. As we develop it in our proposals on the post-2020 CAP reform "For an in-depth reform of the CAP in a multilateral framework to be renewed", this first level of regulation must be coupled with a second level of public regulation of crises market. The introduction of the aid for the voluntary reduction of milk production in 2016 has shown the effectiveness of this type of instrument, even if greater reactivity should in the future be found.

Conclusion

The American dairy policy highlights the main failure of this sector: the lack of a milk price formation mechanism. Vertical integration by giant cooperatives among other major exporters must be seen as a way to overcome this lack.

In the French situation, the prospect of extending "sectoral interventions" to all productions, announced in the post-2020 CAP, is an important issue for reorganizing dairy farmers. Exceeding current trade relations and improving the sharing of value added are central issues for the future of the industry. This requires a reorganization into larger structures and a collective control of production volumes.

While the failure of the "contractualization" is patent, it is advisable to think the reorganization of the producers. If the French public authorities have the levers to accompany the reorganization, it is up to the dairy producers to collectively take up this issue. The patient work of setting up vertical POs undertaken since 2012 has been an important investment which must now bear fruit. There is no longer any point in trying to divide the producers, their interests are largely common. For cooperatives, the next CAP is a major issue, they have the opportunity to become the structuring variable of the equation of reorganization. Finally, for private processors this is an opportunity for a rebalancing that will sustain the entire industry and pacify unsustainable trade relations with the public.

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Annex :

Sensitivity analysis :

Effets de différents niveaux de variation du prix de l'ensemble des produits laitiers transformés sur les prix du lait dans les FMMO															
Variation du prix des produits	-50%	-30%	-20%	-10%	-5%	-2%	-1%	0%	+1%	+2%	+5%	+10%	+20%	+30%	+50%
Classe I	-52,3%	-32,4%	-21,7%	-10,8%	-5,4%	-2,2%	-1,1%	0,0%	1,1%	2,2%	5,4%	10,8%	21,7%	32,5%	54,2%
Classe II	-54,9%	-32,9%	-22,0%	-11,0%	-5,5%	-2,2%	-1,1%	0,0%	1,1%	2,2%	5,5%	11,0%	22,0%	32,9%	54,9%
Classe III	-60,8%	-36,5%	-24,3%	-12,2%	-6,1%	-2,4%	-1,2%	0,0%	1,2%	2,4%	6,1%	12,2%	24,3%	36,5%	60,8%
Classe IV	-57,6%	-34,6%	-23,0%	-11,5%	-5,8%	-2,3%	-1,2%	0,0%	1,2%	2,3%	5,8%	11,5%	23,0%	34,6%	57,6%
Uniform	-56,5%	-34,3%	-22,9%	-11,4%	-5,7%	-2,3%	-1,1%	0,0%	1,1%	2,3%	5,7%	11,4%	22,9%	34,3%	57,2%

		Effets de différents niveaux de variation du prix du beurre sur les prix du lait dans les FMMO													
Variation du prix du beurre	-50%	-30%	-20%	-10%	-5%	-2%	-1%	0%	+1%	+2%	+5%	+10%	+20%	+30%	+50%
Classe I	-2,0%	-1,2%	-0,8%	-0,4%	-0,2%	-0,1%	0,0%	0,0%	0,0%	0,1%	0,2%	0,4%	0,8%	1,2%	2,0%
Classe II	-22,1%	-13,3%	-8,9%	-4,4%	-2,2%	-0,9%	-0,4%	0,0%	0,4%	0,9%	2,2%	4,4%	8,9%	13,3%	22,1%
Classe III	-2,3%	-1,4%	-0,9%	-0,5%	-0,2%	-0,1%	0,0%	0,0%	0,0%	0,1%	0,2%	0,5%	0,9%	1,4%	2,3%
Classe IV	-23,2%	-13,9%	-9,3%	-4,6%	-2,3%	-0,9%	-0,5%	0,0%	0,5%	0,9%	2,3%	4,6%	9,3%	13,9%	23,2%
Uniform	-6,6%	-4,0%	-2,6%	-1,3%	-0,7%	-0,3%	-0,1%	0,0%	0,1%	0,3%	0,7%	1,3%	2,6%	4,0%	6,6%

		Effets de différents niveaux de variation du prix de la poudre de lait écrémé sur les prix du lait dans les FMMO													
Variation du prix de la poudre de lait	-50%	-30%	-20%	-10%	-5%	-2%	-1%	0%	+1%	+2%	+5%	+10%	+20%	+30%	+50%
Classe I	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Classe II	-32,8%	-19,7%	-13,1%	-6,6%	-3,3%	-1,3%	-0,7%	0,0%	0,7%	1,3%	3,3%	6,6%	13,1%	19,7%	32,8%
Classe III	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Classe IV	-34,4%	-20,6%	-13,7%	-6,9%	-3,4%	-1,4%	-0,7%	0,0%	0,7%	1,4%	3,4%	6,9%	13,7%	20,6%	34,4%
Uniform	-7,3%	-4,4%	-2,9%	-1,5%	-0,7%	-0,3%	-0,1%	0,0%	0,1%	0,3%	0,7%	1,5%	2,9%	4,4%	7,3%

		Effets de différents niveaux de variation du prix du cheddar sur les prix du lait dans les FMMO													
Variation du prix du cheddar	-50%	-30%	-20%	-10%	-5%	-2%	-1%	0%	+1%	+2%	+5%	+10%	+20%	+30%	+50%
Classe I	-45,7%	-27,4%	-18,3%	-9,1%	-4,6%	-1,8%	-0,9%	0,0%	0,9%	1,8%	4,6%	9,1%	18,3%	27,4%	45,7%
Classe II	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Classe III	-51,3%	-30,8%	-20,5%	-10,3%	-5,1%	-2,1%	-1,0%	0,0%	1,0%	2,1%	5,1%	10,3%	20,5%	30,8%	51,3%
Classe IV	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Uniform	-37,9%	-22,8%	-15,2%	-7,6%	-3,8%	-1,5%	-0,8%	0,0%	0,8%	1,5%	3,8%	7,6%	15,2%	22,8%	37,9%

		Effets de différents niveaux de variation du prix de la poudre de lactosérum sur les prix du lait dans les FMMO													
Variation du prix de la poudre de lacto	-50%	-30%	-20%	-10%	-5%	-2%	-1%	0%	+1%	+2%	+5%	+10%	+20%	+30%	+50%
Classe I	-6,5%	-3,9%	-2,6%	-1,3%	-0,6%	-0,3%	-0,1%	0,0%	0,1%	0,3%	0,6%	1,3%	2,6%	3,9%	6,5%
Classe II	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Classe III	-7,3%	-4,4%	-2,9%	-1,5%	-0,7%	-0,3%	-0,1%	0,0%	0,1%	0,3%	0,7%	1,5%	2,9%	4,4%	7,3%
Classe IV	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Uniform	-5,4%	-3,2%	-2,1%	-1,1%	-0,5%	-0,2%	-0,1%	0,0%	0,1%	0,2%	0,5%	1,1%	2,1%	3,2%	5,4%