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Analysis

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Regulations of the dairy sector: what's at stake?

The profound crisis that the dairy sector is currently going through is in sharp contrast to the euphoria of 2007. Structural analysis of the sector, based largely on the criteria used by public economics, enables us to identify, among the specific features of the industry, those that justify the implementation of regulations. The characteristics of milk, a perishable, bulky product, and the concentration of processing factories mean that the relationship between production and primary processing is more akin to a captive market than to a competitive market. This market failure has major implications for both price formation and the distribution of value-added. Alongside this, examination of the diversity, evolution and location of the farming systems highlights a second market failure, linked to environmental and social external costs. How can these two failures, and the interactions between them, be corrected coherently? This is the initial central issue for the invention of modes of regulation that bring together markets, contracts and public policy in the future.

The dairy industry is living through stormy times. In the space of two years, the context has changed radically. The announcement of the total take-up of EU stocks, combined with the drought in the Pacific, led in the spring of 2007 to a hike in international prices for butter and milk powder, which was as explosive as it was unexpected. In a little over two months, the export price for European butter thus shot up from USD 2,000 to USD 6,000 per tonne. Evidence, if evidence were needed, of the instability of agricultural markets, is provided by the fact that promises of years of plenty for dairy farmers have given way, in just two years, to a very profound crisis. Among the explanatory factors one can point to an international context marked by recession and a highly energetic response from production to the historical soaring of prices. It would nevertheless appear to be difficult to reduce the analysis to just these two cyclical factors. Indeed, if ways out of the crisis are to be identified, this will require a thorough examination of the structural factors in the sector, which justifies the conclusion that the plan for phasing out the quota system initiated in 2003, with no proposals for any alternative public regulation, inevitably led not to a soft landing[1] but in fact to a harsh awakening.

This note therefore sets out to identify, independently of the cyclical context, the issues, not only economic but also social and environmental, to be grasped if we are to conceive of ways of combining market-based, contractual and public modes of regulation. To do this, we make use of the standard analysis criteria from public economics, which underpins the justification of public intervention for the correction of market failures. However, we also use other approaches such as that referred to as the theory of the "farm problem" that was very much in vogue in the United States in the years 1950-60, or more empirical approaches based notably on an understanding of public and private modes of regulations of the dairy sector set up on other continents.

1 - Endogenous factors for instability in dairy markets

There is generally relatively little elasticity in the demand for agricultural products, especially in developed countries. The composition of milk, its calcium and casein content, restrict the possibilities for substitution effects, although milk fats can be marginally replaced by vegetable fats and milk proteins by plant proteins. The price elasticity of demand is therefore very limited. Moreover, in countries where the standard of living is already relatively high, variation in household income

1. The expression "soft landing" is the European Commission's own.

has less influence on the quantity than the proportion of integrated services (prepared products). As a consequence of the rigidity of demand resulting from these two inelasticities, lowering the price has little effect on consumption. This in turn means that small variations in the supply of milk will generate wide variations in price. This factor for instability, which is not specific to milk, is the basis of King's Law, first formulated in the 18th century.

Asymmetry in the supply response to price variation is another factor conducive to instability, a factor all the stronger for the fact the facilities required for milk production are specific and costly. In the short term, the ability of dairy farmers to respond to a price rise may be very rapid, up to a certain degree. Delaying the culling of dairy cows or increasing the proportion of feedstuffs with concentrated energy and protein content in the feed ration enables production to be aligned quickly with a context in which prices are high[2]. Such increases are feasible insofar as no new capital expenditure is required. Continuous increases in dairy cow productivity had in fact allowed the number of cows to be reduced on holdings with limited production, which then freed up space in the livestock housing. This was made very clear by the expansion in milk collection that followed the explosive rise in prices of 2007 permitted by the increase in provisional quota allocations at the end of the campaign.

Conversely, adjusting production with falling prices is always constrained by the existence of major fixed costs. These relate in certain cases to specific costs that are difficult to recover (sunk costs): milking machines, milk refrigeration systems, livestock housing, machines for fodder, and so on. The high level of such fixed costs is reflected in a production cost structure in which the variable costs – i.e. those directly proportional to production – remain lower than the fixed costs[3]. This in turn means that, individually, a farmer is acting quite rationally if he continues to produce even at prices that are below his total costs but above his variable costs. Given the liquidation value of their investments, he is "losing" less by continuing to produce and consenting as far as he can to a reduction in the remuneration of his capital and work. This pattern is at the root of the crisis of excess capacity so well described by Keynes in his time. In the absence of adequate programmes to eliminate some of the excess capacity, such crises can last right up to the point where, as the infrastructures fail to be renewed, declining production no longer meets the demand.

All in all, the combination of inelastic demand and supply with only limited capacity for adjustment compromises any swift return to a situation that would correspond to the theoretical case in which the equilibrium price equals the total cost of production.

2 - A captive market situation...

The characteristics of milk, a perishable, bulky product of which 90% is water, entail a number of constraints for its collection. This must be both frequent and regular within a maximum 72-hour timeframe. This means that primary processing cannot be carried out at too great a distance from the place of production (utilization of milk on the farm accounts for no more than 2% of total production[4]). Thus, except for a very small number of areas where the density of dairy farms is high, it is quite often the case that there is only one processing facility collecting all the milk produced in the surrounding area. This constraint, imposed by the very nature of the product, makes it virtually impossible to create a market that is competitive between production and primary processing. It puts every producer in a situation where he risks being excluded from the collection rounds of his 'only' customer. Moreover, like most other supply chains, producers are still very fragmented in the face of an increasingly concentrated dairy industry. In France in 2008 there were 82,600 farms delivering milk. Dealing with them, the four leading French dairy firms accounted for almost 41.1% of all milk collection, and the nine leading firms for 50.4%[5]. Therefore, the relationship between producers and primary processors is better described as a captive market than as one of pure, perfect competition.

... affecting the formation of the price paid to the producer...

Such a state of affairs is not without its importance for the formation of the price paid to the producer. This is of course not an issue for cooperatives, controlled by the producers themselves. It even seems to be the case that cooperatives, by developing or taking over processing facilities, have historically been the main alternative solution for this market failure. Danish and Dutch dairy cooperatives are a good example of this: in both countries – Arla Foods for the former and Friesland-Campina for the latter – a cooperative group enjoys a quasi-monopoly at national level.

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2. *Increased milk production due to herd expansion and more concentrated feed, Agreste Conjoncture, July 2008 [Production laitière accrue grâce au renforcement du cheptel et à une alimentation plus concentrée, Agreste] http://www.agreste.agriculture.gouv.fr/IMG/pdf/syntheseanimaux-lait0807-2.pdf* ; Capacity for adjustment of production and prospects for changes in dairy farms, Institut de l'élevage, April 2009 [*Capacités d'ajustement de la production et perspectives d'évolution des exploitations laitières*, Institut de l'Élevage, avril 2009] *http://www.inst-elevage.asso.fr/IMG/pdf_CR_00.09.50.102.pdf*.

3. According to the *"Résultats 2007 des exploitations d'élevage bovin lait" http://www.inst-elevage.asso.fr/IMG/pdf_CR_080950006-v.pdf* issued by the *Institut de l'Élevage*, applying IFCN methodology to the 332 holdings in the *Réseaux d'élevage* (livestock farming networks), variable costs are determined as being €190 per 1,000 litres. The total cost including remuneration for non-salaried work set at 1.5 times the French minimum wage [SMIC] stands at €467 per 1,000 litres. It should be pointed out that to the proceeds generated by milk sales those arising from sales of livestock need to be added, this being approximately €55 per 1,000 litres.

4. AGRESTE, annual agricultural statistics, production of milk and use on farms, 2008 figures [AGRESTE, *Statistique agricole annuelle, production de lait et utilisation à la ferme, résultats 2008*] *http://agreste.maapar.lbn.fr/TableViewer/tableView.aspx?ReportId=7378*.

5. *Source: Annual Dairy Survey, Statistics and Foresight Department, French Ministry of Food, Agriculture and Fisheries* [*Enquête annuelle laitière*, Service de la Statistique et de la Prospective, MAAP] *http://www.agreste.agriculture.gouv.fr/enquetes/industries-agroalimentaires-529/enquete-annuelle-laitiere-enquete/*.

Dairy policy in the United States, the main lines of which have changed only very little since the 1930s, deals head-on with this absence of a competitive market: the price paid to the producer is set by regional boards every month to reflect changes in the markets for processed products and milk for consumption. This means that all producers receive the same base price (the "blend price") from their milk processors. Alongside this, a pooling system between milk processors allows those focused more on products generating less value-added to be compensated for having to pay a price corresponding to a mean value across the geographical area covered by the pooling arrangements (the United States is divided into 11 "Federal Milk Marketing Orders")[6].

Transparency of information on costs and volumes is a necessary condition to be met if such a policy is to work. In France, the price recommendation system for producers discussed in the interprofessional dairy organisation can be considered as a palliative for this failure of markets.

... and raising the issue of the distribution of the value-added

A corollary to the issue of price formation is that of how value-added is shared between production and primary processing. Generally speaking, there are two possible cases. Producer prices can correspond to the marginal value, which offers the least value-added, such as milk powder. On the other hand, producer prices can be higher than this marginal value and the producer benefits in part from the best valuation of certain product ranges, value-added products for example. Such pooling between the different outlets is established spontaneously in a cooperative where the producers themselves decide on the allocation of the proceeds and adopt the same base farm gate price. American dairy policy is based on this pooling principle, but it is applied across all the processors in a defined production area.

The intention of the French recommended price system is also to share value-added. Using its designations of origin and its brands, the French milk processing industry has major advantages for extracting value from its milk, although some processors are essentially specialised in industrial products. Recommendations are based on a weighting of the various valuations (the "product mix"), but given the diversity of product-mixes and in the absence of any equalisation between processors, a single national recommendation, if it were to be followed, could only be based on the product-mix of the company with the lowest valuation.

The issue of how value-added is allocated must also be looked at in light of the whole set of technical constraints applicable to both production and processing. While consumption varies only marginally over the year, production follows a more or less marked seasonality essentially dependent on the way in which dairy herds are managed: put simply, the more cow nutrition relies on pasturage, the more production varies over the year. However, the example of New Zealand and certain production systems used in the West of France (the "André Pochon" method) show clearly that the production costs of such grass-based systems are among the lowest. Therefore, there is constant tension between the continuity of supply necessary for the manufacture of fresh (and high value-added) products and the deseasonalisation of production that is costly to achieve and difficult to plan (a cow is not a tap that can be easily turned on and off!). The upshot of such considerations is that comparison of European costs with those of our competitors in New Zealand is largely irrelevant: the majority of their production is generated over the six months in which grass growth is sufficient and it is used to make both milk powder and butter. Moreover, deseasonalisation is never complete since there will always be a low point in production during the summer. What this means is that in order to ensure continuity in the supply of fresh products, even when production is at its lowest ebb, a proportion of the milk produced must always be channelled towards lower value-added products. The same is true of the technical constraints on processing: some facilities producing fresh products shut down at the weekend for reasons related to logistics and work organisation. Therefore, at the weekend, milk will tend to go to the spray dryers. Thus, it is estimated that no less than 15% of all milk collected will always be used for industrial products.

Price transmission and loss-leaders

The third and last consequence of this market failure is of a more routine nature and is not specific to agriculture; it is to be seen in all sectors where there is an imbalance in bargaining power between actors in the supply chain. The existence of unequal bargaining powers affects satisfactory price transmission down the value chain, creating rent seeking behaviour. The issue of imperfect price transmission is all the more important when such markets are subject to high levels of volatility. Conversely, it should be stressed that certain dairy products may serve as loss-leaders for retailers. In this case, their strategy is to limit their margin and, more specifically, to apply greater pressure to their suppliers to encourage them to offer low prices on standard consumer products the price of which acts as a benchmark and a source of comparison for the consumer.

3 - Economies of scale versus economies of scope

The perishable, bulky nature of milk is the main determining factor for the location of production and processing. As has already been seen above, the rationalisation of raw milk transportation costs is a force for increased concentration of farms and regional specialisation. The bigger the agricultural holdings are, and the more gathered they are next to a milk processing plant, the lower collection costs will be. In France, milk quotas with limited

6. Institut de l'Élevage, *The Dairy Industry in the United States*, May 2008 [*La filière laitière aux États-Unis*, mai 2008].

geographical mobility have enabled this phenomenon to be restricted but it has led nevertheless to the concentration of 48% of milk production in a broad swathe of western France. It should be added that a nearby sea port, and hence access to imported plant proteins, is among the factors that can trigger such a clustering process. Concentration of farms can, within certain limits, be conducive to the implementation of certain organisational modes that will improve working conditions for farmers: a holding big enough to support at least two independent farmers (i.e. who do not form a couple) will substantially lighten the working constraints imposed by dairy farming. The importance of this is far from marginal since some experts believe that the limiting factor over the next few decades is likely to be the human factor. The absence of certainty with regard to the situation of dairy sector in the future is assuredly not conducive to attracting new entrants to a sector in which, historically, the extremely hard work required of farmers has been offset by a form of stability based on the regularity of its monthly earnings.

Growth in farm size makes economies of scale possible: by producing more, farmers can reduce their production costs and become more competitive. However, such economies of scale are possible only up to a level beyond which a production rise also means a higher average production cost. Compared with other sectors of the economy, this level is fairly low for agriculture. It is generally considered that beyond the main indivisible factors imposed by fixed components (half a tractor is not possible, for example), economies of scale disappear. Reference is also made to the particular nature of land as a factor of production. Deciding where to place the limit is no easy matter. The number of cows is far from being the principal criterion when examining the competitiveness of very diverse farms. In particular, the mutually complementary relationship between a milking enterprise and land under crops is of key importance. This is so because the recycling of manure from livestock as an input for crop production on the same farm has advantages that are both environmental (up to a point) and economic, due to the lesser need to buy in fertiliser. Likewise, the herd has a useful source of fodder available to it. This complementary relationship provides *economies of scope*, as opposed to *economies of scale*: in the second of these cases, specialisation makes it possible to achieve high levels of production leading to lower production costs for the last units produced, whereas in the first it is diversification and complementarity between more than one type of production that leads to reduced production costs. Further-more, such complementarity can diversify risk and enhance the farm's resilience. In order to illustrate this opposition between economies of scale and economies of scope, one can for example point to the fact that increasing herd size will in practice limit the possibilities for putting the cows out to pasture.

This focus on the tension between economies of scale and economies of scope provides a useful prism through which to look at all three dimensions of a production system's sustainability: economic, social and environmental. In theory, taxes and subsidies coupled with external costs that may be negative (pollution) or positive (landscape, carbon sink, land occupancy) enable this second type of market failure to be corrected. Farmers can then steer their production systems towards greater sustainability simply on the basis of price signals, both product and input prices. In actual practice, it can be seen that the internalisation of external costs, is far from being as easily achieved and, above all, as effective as claimed. Especially when it comes up against determinants for the evolution of production systems as massive as the regional specialisation driven by rationalisation of collection costs, for example. It would thus be reasonable to find a way of acting directly on production systems to offset the weakness of the spreading effects of environmental policies.

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Structural analysis of the dairy sector highlights the fact that regulation of this sector cannot be solely market-oriented. Various factors, including sources of instability intrinsic to heavy industries faced with inelastic demand, the captive market between production and primary processing and dairy production external costs, justify public intervention. Given this, the question arises as to the resources and tools to be used to correct such market failures. As does the question of the relationship between those tools and their overall coherence.

The new regulatory modes to come will doubtless combine markets, contracts and public policies. In order to work upon their design, there will be a need, as an initial approach, to get the benefit of foreign experience in these matters. There will also be a need to arrive at a general cost-benefit assessment for milk quotas in their current configuration and to identify permissible room for manoeuvre while remaining within the competition rules when remedying a situation characterised by a lack of fragmentation.

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