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► **To cite this version:**

| Jean Cordier. Multiannual price risk management. 2017. hal-02788948

HAL Id: hal-02788948

<https://hal.inrae.fr/hal-02788948v1>

Submitted on 5 Jun 2020

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Study on risk management in EU Agriculture

Annex 4 - Case study 4
Multiannual price risk management

Written by Jean Cordier
October - 2017



EUROPEAN COMMISSION

Directorate-General for DG for Agriculture and Rural Development

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European Commission

B-1049 Brussels

Study on risk management in EU Agriculture

Case Study 4: Multiannual price risk management

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Luxembourg: Publications Office of the European Union, 2017

Catalogue number KF-04-17-138-EN-N

ISBN 978-92-79-73710-7

Doi 10.2762/713691

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Foreword

This case study report has been prepared within the “Study on risk management in EU Agriculture” which has been implemented by Ecorys and Wageningen Economic Research between December 2016 and October 2017.

The case study has been prepared by individual expert. The authors of each case studies were selected because of their specific subject expertise. It should be noted that the case studies reflect the opinion and personal style of these experts. The findings in these case studies are used to illustrate and triangulate the outcomes of the data collection in the main report.

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Executive summary

Main findings with respect to the specific question of the case study

Price risk management is a crucial issue for farmers and for the supply chain operating under competitive market conditions. The lack of visibility on the future of markets induces short-term production decisions and sub-optimal long-term investment behaviour, with adverse consequences on agricultural competitiveness. Incomplete futures markets for agricultural product is considered to be a market failure that may need to be addressed through public policy interventions. Within the EU, liquid futures markets exist for only some grains and oilseeds. Market participants have developed numerous derived OTC contracts for these sectors that allow quite efficiently the management of intra-year price risk. When liquid futures markets are limited or when they do not exist, which is the case for livestock and dairy production, the chain actors are limited to spot markets with very limited capacity to manage price risk. Short term market risk is partially captured by periodic deliveries (milk or pigs) but risk is also imbedded in input cost volatility (feed costs). That is why actors within the food chain search for long-term price agreements to manage the first bandwidth of price or gross margin variation.

Market risk management is first a private issue. Adequate equity level with respect to economic risks, prevention measures, diversification practices and risk transfer to service providers, such as insurers or financial intermediaries (credit and OTC contracts), are basic instruments and methods. Risk management within the food chain is another approach. Vertical integration has some benefits but is limited in the food sector as business activities became increasingly specialized and therefore segmented. After quite a long experience of integrated quality management, some companies are developing an “*integrated price risk management*”.

Interviews have been performed with representatives of companies, private and cooperatives, that are designing and testing OTC contracts with forward pricing methods so as to present their private marketing initiatives for price risk management. As a first result, it is clear that long-term price agreements look homogeneous in their design and use. As a second result, it can be stated that such long-term agreements are fragile when faced by of extreme market situations. Losses suffered by one party may disrupt the contract.

Homogeneity of long-term price agreements: they are usually imbedded within cost-plus contracts between farmers and the “cracking” industry¹ (private firm or cooperative). These contracts are backed by a set of contracts for derived products with final clients, usually large food processors. Cost-plus contract to share market risk require the computation of a base price using cost indices. Symmetric or asymmetric tunnels are then defined to share risks in an acceptable bandwidth of price variation. The contracts may be completed by a formula to share added value to the agricultural product.

Sustainability of contracts: the rules of governance are straightforward when the market price stays at a “fair distance” from the base price but are more difficult to define and to implement when price deviates heavily from it. Contractors are therefore looking for

¹ Agricultural products are first processed to “crack” their main components by a first-hand industry in the food chain. Then these components, usually called ingredients, are used by final food industry for producing consumer foods.

specific measures to cope with situations when prices leave the price (or gross margin) tunnel. These measures, usually called “market adjusters”, are difficult to design and may be considered as the limiting factor for the implementation and development of long-term price agreements.

The case study draws conclusions on the need for a public instrument (or private-public one) that could support the willingness to manage market risks within the food chain. The general finding is that market participants, farmers, the “cracking” industry, and the final food industry are able to manage a level of price risk but that they cannot handle extreme market situations.

Main implications with respect to public policy

The case study has two main public policy implications.

1. The first implication relates to the development of a learning curve for designing and implementing long-term price agreements, and even short-term agreements when futures markets are missing. It is clear that food chains are willing to develop such agreements but initial transaction costs may be too large for satisfactory results.

2. The second implication relates to the potential of a public-private instrument to support the development of long-term price agreements. First of all, is it feasible? And, if so, how is it possible?

Mutual funds to stabilize farmer income (IST art. 39), which are up to now still in a research phase, may create an opportunity to complete food chain initiatives if they are built on common indices and thresholds for compensation. Traditional commodity programmes such as price intervention may also be of interest but should be redesigned in order to limit supply responses. Other public-private instruments may be designed to support the price agreement for first bandwidth of price or gross margin variation by private actors, such as hybrid contracts (revenue and margin insurance).

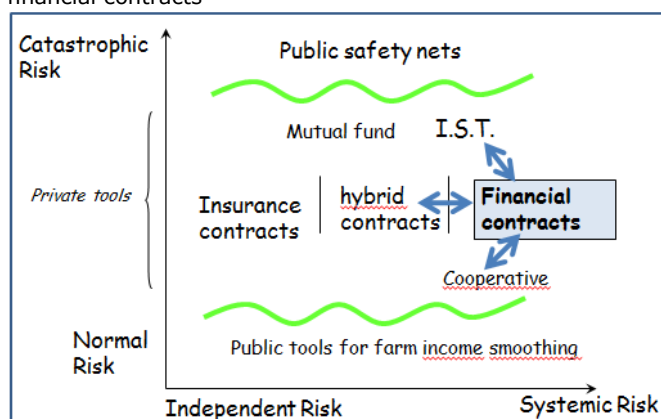
1 Introduction

1.1 Positioning of the instrument in the two-axis map of agricultural risk

Price agreements for intra-year or multi-year risk management are basically “financial instruments” as they deal with rate of return (sales value and cost of procurement) and risk. They are therefore dealing with systemic risks at the second level of market risk², as illustrated in Figure 1. These price agreements are usually derived over the counter (OTC) contracts such as fixed multi-period forward contracts usually backed to futures contracts (multi-period basis contracts). They are limited by the liquidity of the market for distant futures and, therefore, to a one-year horizon. This one-year horizon is common, as producers of seasonal products are concerned by the total period of production and storage and industrial buyers are building their procurement strategy within this lap of time.

Multi-annual price agreements may have a longer horizon, dealing with a three or even five years horizon. These contracts, now at a marginal level of use, are helpful for securing loans for productive investment.

Figure 1: Positioning of the financial contracts



Source: adapted from Cordier and Guinvarc’h (2002)

The positioning of “*Financial contracts*” on the two-axis map suggests links with cooperative practices and potentially with the implementation of an income stabilisation tool (IST, article 39) and the development of hybrid contracts such as revenue or margin insurance. Synergies should be found in the design of such instruments (i.e. indicators) and coordination of parametrization.

² The first layer is related to the permanent low level of risk that should be managed by a minimum of equity level, precautionary saving accounts and adequate smoothing taxation. The second layer is handling to regular events that create income volatility, climatic or sanitary events that create exogenous volatility or events on other economic sectors that react on agricultural markets to create endogenous volatility (as well as inadequate market anticipations by actors). The third layer is related to extreme low level of income due to catastrophic event.

1.2 Objective of the case study and expected contribution to the portfolio of cases

The main objective of the case study is to elicit the potential of contractual agreements allowing price risk management when futures markets are missing with a focus on multi-year risk management. The case study will first provide an overview of futures contracts with effective reference markets (in other words with sufficient liquidity) within the EU, in order to define a range of sectors without such liquid futures contracts. The case study will then present a comparative analysis of innovative contractual agreements in the dairy and pig sectors, provided by private and cooperative actors in Ireland, France, the Netherlands, and Germany. The case will present the conditions surrounding the development of such agreements, and the demands of innovative companies for support by public policy.

2 Main outputs of the desk study

The main arguments for contractual agreements in agriculture are based on price and/or margin risk management, market access, risk on capital investment and quality assurance (Mc Donald et al. 2011). Marketing contracts can mitigate market risk in decoupling formula pricing (output price or margin over production costs) from market spot price. Arguments for multi-year contracts are on minimizing transaction costs, in particular when vertical integration is not feasible. Long term contracts with price indexation and value share agreements have also been presented as a means to overcome the “hold up” problem related to asset-specific investments, which has the potential to drastically increase transaction costs³. Recent analysis suggests that producers are willing to enter long-term contracts when long-run demand elasticity is higher than short-term elasticity. This type of analysis has not been performed for agricultural products. Finally, long-term contracts can also lead to improvements in product quality. Buyers are interested in credence goods with specific quality attributes which can be segregated in the marketing chain. Contracts support quality assurance up to the consumer.

The dairy sector in the EU was officially deregulated in 2015 (abandonment of the milk quota), although price volatility started to increase in 2006 (related to the stepwise lowering of milk price support in that period). As it is a capital-intensive sector (with specific assets) both from the producers and the industry sides, the dairy sector could theoretically be willing to develop long-term marketing contracts. The EU sugar sector, very intensive in capital, will be deregulated in 2017. It is also a field of potential analysis in terms of development of long-term contracts with pricing and share value formulas. The grain and oilseed sectors, which were deregulated after the CAP reform of 1992, have developed a sophisticated OTC market derived from futures markets, beginning with the launch of the rapeseed contract by MATIF in France in 1994 and later the wheat and corn contracts in 1996 and 1999 respectively (Begue-Turon et al. 2016). Forward contracts, in various forms, are usually limited to twelve to fifteen months but are slowly being extended to twenty months by market participants. Therefore, they are not multi-year contracts that could support specific investments in these sectors apart from biofuels (and related contracts). Market shares of cooperatives in the dairy and sugar sectors in France that are about ten times the ones in the grain and oilseed sector support this differentiation among sectors.

Limited recent academic work has been published on applied marketing contracts and no systematic study on existing long-term contracts in the agricultural sector has been performed in the EU⁴. There is no descriptive work for presenting existing long-term contracts or analytical work to explain the potential and limits of formula pricing, value share systems and price adjusters (in the sense of Goldberg 1985) between farmers and the food processing industry in existing contracts.

Most of the information presented in this case study has been collected through interviews and related professional documents.

³ The seller or the buyer who is investing in a specific asset is constrained in terms of quantity, quality with respect to its counterpart. The counterpart may therefore take advantage of this constraint in the price negotiation and catch the benefit of the investment. It is called a “hold up” in industrial economics

⁴ A research on Google Scholar on terms such as “commodity long term contracts”, “long term marketing contracts” or “multi-year price agreements provided few publications from the USDA on the US case and articles on gas and oil long-term contracts after “market deregulation”. No recent study on this issue for agricultural commodities has been found.

3 Main outputs of the interviews of key stakeholders

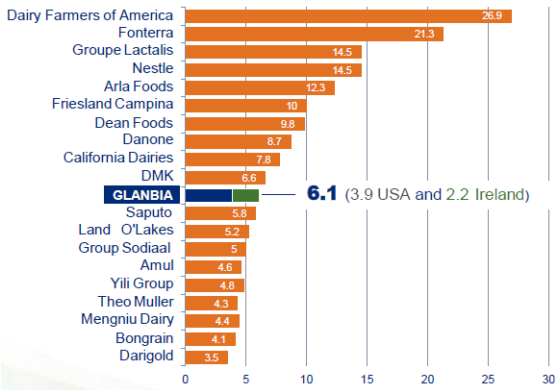
Interviews have been performed in the dairy sector in three Member States: Ireland (Glanbia Ingredients Ireland – GII), France (SODIAAL) and the Netherlands (Friesland-Campina). Documents have been collected for the German case of OMIRA. Interviews have also been conducted for the pig sector and sugar sector in France to compare their long-term contracts with those for dairy.

“Glanbia Ingredients Ireland” (GII) risk management instruments and methods

Interview of Mr Sean Molloy, Director of Strategy and Supply Development, and Mr Brian Hanafin, Risk Manager

In 2016, this Irish dairy cooperative Glanbia had a turnover of €5 billion, 4 800 dairy producers within 16 000 members, and six thousand employees. It is the first dairy company in Ireland with 2.2 billion litres of milk processed (more than 6 billion worldwide) and the 11th largest global dairy company in the world as presented in Figure 2.

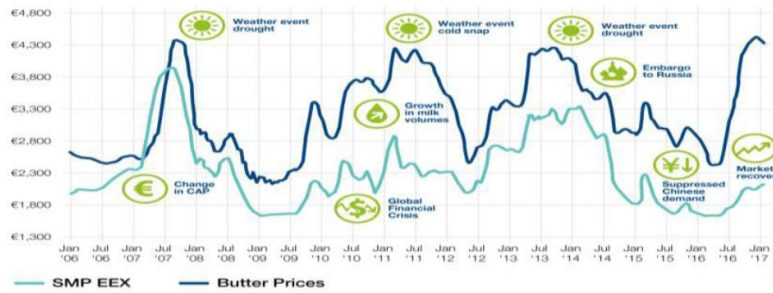
Figure 2 Top 20 Dairy processors (billion litres)



Source: internal document GII (2017)

With a dynamic increasing supply of milk from producers with “ambitious expansion plans from the typical GII supplier” and a related 285 million euros of processing investment during the 2013-16 period, GII developed a basic milk supply agreement whereby producers deliver all their milk production and the company accepts all milk produced. Price volatility of dairy products, as illustrated in Figure 3, is a major concern for the development process, “a key market challenge” both on the client and dairy producer sides. That is why, as stated in their business presentation document, GII is looking to be “leading the international effort to address volatility”. Several times during the interview, this effort has been characterised as: “We are on a long journey to try to develop more”.

Figure 3 EEX Butter and Skim Milk Powder Prices (2006-2017)



Source: internal document GII (2017)

Beyond the basic milk supply agreement on product flows, Glanbia is offering four complementary market risk management instruments:

1. the Fixed Milk Price schemes (Glanbia-FMP or GFMP) since 2011;
2. the MilkFlex, where loan repayments are linked to milk price triggers;
3. an advance payment scheme (GAP) that supports farmers' cash flows during low market periods, enabling them to meet current expenditure commitments;
4. a co-op support package that include traditional dividend payments, specific rebates on feed and fertilizer, along with some direct support payments.

For comparative analysis with other long-term price agreements of private and cooperative companies within the EU, only the first instrument, the fixed milk price scheme, is described⁵. In 2011, Glanbia started to offer dairy farmers the opportunity to protect their gross margin through an agreement whereby farmers received a fixed price⁶ for part of their milk delivery for a three years period⁷. The three-year contract was offered in 2012, 2013 and 2014 (schemes 1 to 4). The Phase 5 schemes of GII, which run from April 2015 to March 2018, introduced a yearly adjustment to reflect movements in farm input costs (feed costs and other variable costs), an inflation adjusting mechanism, and another market adjuster for "extreme market events"⁸. Movements in farm input costs are index-based and measured by the Irish Government Central Statistics Office.

By the end of 2016, through the first six schemes, GII had contracted over 1.7 billion litres from more than 2 000 milk producers. In December 2016, GII announced the two latest schemes (Phase 8 and Phase 9) to start on January 1st 2017. Phase 8 is a three-year fixed milk price/margin scheme and Phase 9 is a one-year fixed milk price scheme. As the contracted price is not adjusted to any mechanism related to production cost, inflation or extreme volatility, the Phase 9 scheme can be considered as a forward contract for a one-year period.

The Phase 8 contract is the most sophisticated contract ever offered by GII. The base price offered for three years is computed from the sum of the variable (and index) costs, fixed (and non-index) costs, and a "protected" absolute producer margin. It is, therefore, a "cost plus" concept of price, adjustable annually using an "index-based" variation of production cost (and inflation). This multi-year contract between GII and its milk suppliers is backed by equivalent multi-year contracts for derived products (with various

⁵ The other instruments are related to the credit market, very useful instruments but usually managed by agricultural banks

⁶ 32.6 cents/litre including VAT and before quality constituents, and 36.17 cents/litre paid on average including VAT and constituents

⁷ Dairygold, another Irish dairy cooperative, initiated an GII equivalent long-term contract early in 2016 (scheme 1) and 2017 (scheme 2)

⁸ An annual "Research & Development" charge of 0,1 cent/litre is applied since 2015 for funding the development of innovative milk pricing mechanisms that protect GII suppliers from price volatility

fat and protein contents) between GII and its clients. Contract prices between GII and its clients are based on a “*cost plus-plus*” approach, whereby the final client accepts the producer margin as well as the intermediary company margin. This price risk management technique, usually called “back-to-back”, allows the intermediary company between the producer and the final user to avoid any market risk if the client portfolio is covering the same fat and protein content as the milk supplied by producers. Under the Phase 8 contract, when the market price passes either the lower or the upper part of a symmetric tunnel around the base price (i.e. “extreme” low or high values), the market adjusting mechanism works by sharing the induced loss/benefit equally (50/50) between the contractors.

In summary, it has been a “*long journey*” to design and implement a risk management scheme for producers and the cooperative. In particular, the issue of extreme market values - when sharing high losses from one participant side with the other one is not sufficient to keep the contract on track - has been heavily discussed. Improving the tool for such situations is an objective of the cooperative. Practically, the cooperative was not aware of the IST art.39 and its potential.

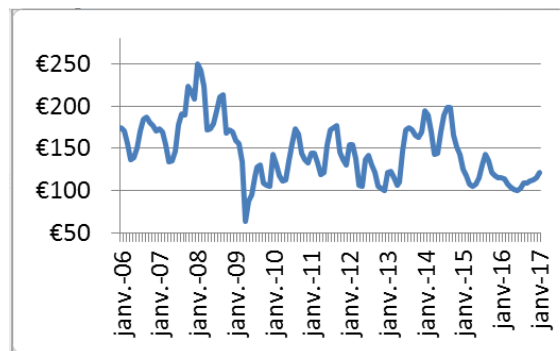
“SODIAAL” risk management instruments and methods

Interview of Mr Frédéric Chausson, Directeur Développement coopératif and Mr Maxime Jouannin, Risk Manager

In 2016, this French dairy cooperative had a turnover of more than € 5 billion, thirteen thousands producers (20 000 members), and ten thousands employees. It is the first dairy cooperative in France with 4.8 billion litres collected.

Since 2010, the cooperative has been seen increasing production volume produced by its members, driven by the prospect of market deregulation in 2015. Milk price volatility has increased since 2006, which has induced higher volatility of producer gross margins since feed cost variations are independent from milk prices (Figure 4).

Figure 4 Illustration of a margin per 1 000 litres on feed costs index in France (monthly data)



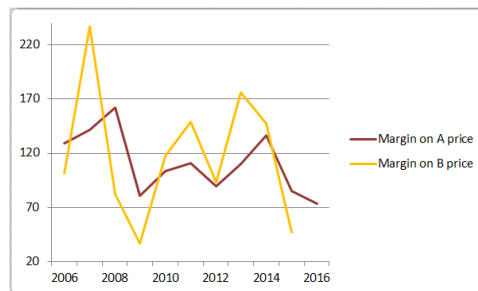
Source: CNIEL

SODIAAL’s approach to market risk management is based on three complementary instruments, in place or currently under practical tests:

1. A double A / B price system;
2. The use of futures markets to back intra-year indexed forward contracts to farmers;
3. The use of a structured OTC contract called “*contrat de marge sécurisée*”.

As a first response to the issue of risk management for both the milk producer and the cooperative, in 2011 SODIAAL implemented a double volume/double price system⁹ with a "A price" based upon the capacity of the cooperative to fulfil domestic market demand, and a "B price" based upon the international market (i.e. the fat-protein commodity value). This double price system is the first stage of a risk management system for the producer, since A price leads a lower margin volatility compared to the B price margin. Figure 5 illustrate the margin volatility based of A and B prices over the past decade.

Figure 5 Margin volatility €/1 000 litres under A and B prices (yearly data)

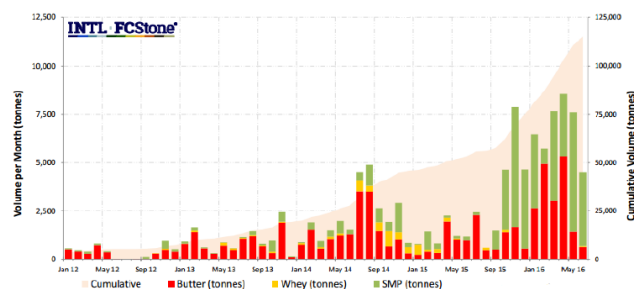


Source: Cordier (2016)

As a second response to price volatility in the dairy sector, SODIAAL is considering the possibility to use futures markets to back milk intra-year forward B contracts with cooperative members. This practice is common in the French grain sector. However, this possibility is constrained by a basis risk and the current lack of liquidity on European markets.

- The basis risk relates to the quality of the price convergence between the industrial products¹⁰, butter and skimmed milk powder, and raw milk from the farm. The traditional basis risk linked to the difference of location between the delivery point of the future contract and the physical location of the market participant should be limited as the European Energy Exchange (EEX) contract is using market indices of European physical markets of reference and cash settlement practices;
- In 2015, Euronext launched three futures contracts on industrial dairy products (butter, skimmed milk powder and whey powder) but without success. Also in 2015, the EEX started three futures contracts on industrial dairy products as part of the transfer of activity from the Eurex Exchange platform (traded since 2012). The liquidity on this exchange seems to improve on a regular basis even though the monthly volume and the open interest are still low (EU Agricultural Markets Brief 2017). The volume of overall EEX Dairy contracts was about 56,000 traded contracts in 2016 as opposed to 26,000 contracts in 2015, as illustrated in Figure 6. The volume should continue to rise in 2017, given that liquidity and volume for the butter contracts were at record levels in March 2017.

Figure 6 EEX Dairy monthly and cumulative volume



Source: EEX (May 2016)

⁹ It is in fact a triple system as the milk volume under the B price is limited for each producer. Beyond this volume, there is a very low C price that creates a disincentive to produce additional milk

¹⁰ Build in an index

SODIAAL is also considering the development of multi-year structured OTC contracts to protect the producer margin. A three-year “secured margin” contract is currently being piloted by the cooperative. It is designed in a similar way to the latest GII schemes, and is very close to Scheme 8. First, the cooperative is setting a target level for the cost of production based upon the method used by *l’Institut de l’élevage* (IDELE) to compute variable costs¹¹, in particular on-farm and off-farm feed cost. A “secured” margin is set by the cooperative based upon historical computed margins. A “cost-plus” price is then computed as a base price for the producer. This base price is first adjusted for quality factors, as usual, and is also adjusted each month to the index *IPAMPA-Lait de vache* as provided by IDELE. The “secured” margin is indexed to the general Consumer Index as provided by the *National Economic Institute of Statistics* (INSEE) on an annual basis. The “secured” margin is not a complete “guaranteed” margin, as market adjusters are completing the structured OTC contract. In fact, the margin is guaranteed as long as the market price stays within a tunnel defined as the monthly base price plus or minus 10 %. If the market price is outside the tunnel, the extra-loss is shared 50/50 by the producer and the cooperative (identical to the adjustment made in the GII contract).

The vision of market risk management presented by SODIAAL during the interviews is based on the three layers scheme. Basic business risk should be supported by firm equity and pre-tax precautionary savings at the farm level. Normal business risk should be transferred to insurers for insurable risks and to the food chain through structured OTC contracts (intra and multi-year) backed to futures markets and/or final clients. Protection for catastrophic risks, with deep variations of prices and margins, should be provided by adequate public or private-public instruments. SODIAAL expressed the idea that public instruments, such as intervention price and induced storage, should be maintained for extreme market conditions and only to actors that limit production development when excessive supply cause low prices. Also, SODIAAL expressed the idea that their “three year secured margin contract” could be supported by a public-private instrument, such as the IST-art. 39. In ideal circumstances, this would require common indices for computing dairy gross margin and common threshold(s) of compensation. The current status of an IST-article 39 could also be used to design improved rules of compensation, which would match private market adjustments imbedded in long-term contract (scaled subsidies, rate of contribution, etc.).

“FrieslandCampina” risk management instruments and methods

Interview of Mr Wim Kloosterboer, Corporate manager Trade & Dairy Affairs and Mr Ruud Krimpenfort, Director Dairy Market Intelligence

In 2016, the Dutch dairy cooperative had a turnover of more than € 11 billion, 13 300 members and twenty two thousands employees. It is the largest dairy cooperative in the Netherlands with 10.8 billion litres collected (about 80 % of the national milk production).

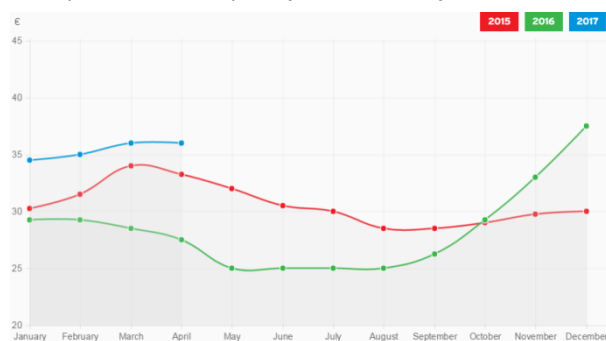
The FrieslandCampina approach to market risk management is based upon a guaranteed base price augmented by a “performance payment”, which is a share of the added value to the guaranteed price. The milk price paid to the producers is adjusted by quality factors (including an outdoor grazing premium), by seasonal premiums and discounts that offer incentives for smoothing production, and augmented by the return on cooperative social shares.

¹¹ These costs are called «IPAMPA – Lait de vache »

The guaranteed price to member dairy farmers is a weighted average of prices paid by benchmark companies in Germany, Denmark, the Netherlands and Belgium. In a first step, the cooperative estimates one-month forward prices for the benchmark companies based on the trend in the published milk prices. The guaranteed price for the subsequent month(s) incorporates adjustments to published prices and various premiums. Finally, the guaranteed price reflects the Central Europe average price and the average value added on milk for benchmark dairy companies.

Figure 7 is illustrating the recent guaranteed price of FrieslandCampina for 100 kilogrammes of milk with a protein content of 3.47 %, a fat content of 4.41 % and a lactose content of 4.51 % and is exclusive of VAT.

Figure 7 Recent guaranteed price by FrieslandCampina (2015 to 2017)



Source: internal document FrieslandCampina (2017)

The performance payment depends on the financial results of the cooperative and the retained earnings policy adopted. The cooperative's net added value, based on the difference between the final value of milk (obtained from consumers and industrial markets) and the average annual guaranteed price is currently shared between the producers and the cooperative; the split is 45 % for producers (10 % for membership return and 35 % for the performance payment) and 55 % for the cooperative (for future investments).

The vision of market risk management presented by FrieslandCampina during the interviews is based upon a guaranteed long-term fair average price, as compared to the Central Europe price benchmark. The vision is also based upon a strategy of constant investment by the cooperative, aimed at the development of a performance payment within the milk price paid to members. The capacity of the cooperative to pay more than the average regional price is supposed to allow a satisfactory functioning of the credit market, for short term loans in case of market crisis and long-term loans for productivity investments at the farm level. The credit market is considered as a major instrument for market risk management¹².

"OMIRA" risk management instruments and methods

Oberland-Milchverwertung GmbH Ravensburg (OMIRA), Annual Report 2015

¹² From a theoretical point of view, beyond the credit market, it can be considered that the land rent system adjustable in value is a supplemental "instrument" of market risk management (Gohin 2012).

In 2016, the German dairy cooperative had a turnover of € 0.5 billion, 2,600 members and six hundred employees. It is a dairy cooperative in the south of Germany with 0.8 billion litres collected.

The strategy of this “small” dairy cooperative is based upon the regional area of production as a “seal of quality”. The regions of the Alps, Allgäu, Lake Constance, Bavaria, and the Black Forest offer unique opportunities for product differentiation based upon quality and sustainability concepts. As expressed in the Annual Report 2015, *“since 2013, the dairy (company) has been in discussion with an interest in OMIRA milk’s special regions of origin, MinusL/lactose-free expertise and top-quality industrial products. In autumn 2013, OMIRA’s collaboration with Mondelez¹³ was turned into a long-term cooperation. In addition to further developing this partnership, the company also intends to build additional partnerships”*.

The OMIRA-Mondelez deal is a back-to-back contract for alpine milk. A milk price of 32.5 cents/kg was fixed for 100 million kg milk for a one-year term (from July 2016 to June 2017). As “the response of the agricultural sector was very positive”, this contract is considered as a preliminary contract that can be further developed by OMIRA and Mondelez, and with other customers from the food industry. *“OMIRA aims to enter into one or two more longstanding win/win relationships. However, deciding on a suitable cooperation partner to create long-term stable access to the growing markets is a systematic process, and one that OMIRA is not going to rush”*. The Annual Report 2015 concludes the section on long-term back-to-back contracting by defining the final goal of this “journey”: to build a sound foundation for investments and developments in the operations of milk producers, dairies and customers in times of highly volatile prices.

“Herta and Porc Armor Evolution” risk management instruments and methods

Interview of Mr Arnaud de Belloy, Chairman Herta France and Mr Daniel Bellec, Director commercial Porc Armor Evolution

Herta is a subsidiary of Nestlé in the pig meat sector. They process some cuts of pig into final products delivered to the consumers through all types of distribution. Porc Armor Evolution and Cirhyo are two groups of producers. The first group is located in Brittany, the west French region, while Cirhyo is a group covering different regions in France.

The third swap contract “Porc-Jambon¹⁴” between Herta and the two groups of pig producers was signed in December 2016. It is a structured OTC contract that fixes an annual base price (1.33 €/kg¹⁵ in 2017) for a standard carcass of pig. Technical coefficients are introduced for linking pig carcass and ham prices. There are also limits on contracted volume per producer (50 % maximum of total volume).

The two first contracts signed in 2015 and 2016 were pure swap contracts without any market adjusters. The experience of a pig crisis in 2015-16, when market prices were very low, has been difficult for the swap participants. Therefore, the third swap introduced market adjusters to share the loss during extreme price variations. If the up or down variation is greater than 0.05 euro/kg, the beneficiary of the variation share 25 % of the gain. The other side of the swap is then supporting “only” 75 % of the loss. If

¹³ Mondelez, formerly Kraft Foods, is an international well-diversified food company

¹⁴ Swap “Pig-Ham”

¹⁵ Based upon the Marché du Porc Breton quality specifications. The pig producer is receiving usually a bonus for quality attributes as measured at the slaughterhouse

the variation up or down is greater than 0.10 €/kg, the loss/gain is shared 50/50 between the swap participants¹⁶.

The vision on price risk management presented by Herta-Nestle during the interview was a long-term concern of its suppliers and, also, an interest for the company to manage correctly the full cost of final consumer products. From the producer's point of view, as expressed by Porc Armor Evolution, their interest was first to be able to manage the gross margin in buying feed (grain and soybean meal) on futures and forward markets. The second interest relates to the capacity to invest through bank loans when margins are secured for a share of the farm production.

The Chairman of Herta, however, has concerns that swaps are fragile contracts when price variations are too large. It is difficult to sign new swaps when a participant suffered heavy losses during the previous swap period. Market adjusters are required but have been limited to date. Both swap participants think that a new design of public instrument should support swap capacity to manage price and margin risks. Practically, the instrument should provide public support to farm income when current gross margin drops below a past average (triennial or Olympic). The Income Stabilisation Tool, when explained to swap participants, looks to be an adequate instrument if indices to estimate gross margin are allowed.

“Agromousquetaires-Intermarché and Aveltis-Prestor” risk management instruments and methods

Interview of Mr Patrick Faure, Industrial Director, Agromousquetaires and Mr Gallou, Director, Aveltis

Agromousquetaires is the industrial subsidiary of Intermarché, a large retailing company in France. In 2016, the company had a turnover of more than €4.2 billion (€40 billion for Intermarché). It runs 62 plants in various food sectors with 11 000 employees. Specifically, Agromousquetaires manages two pig slaughterhouses¹⁷ (50 000 pigs/week) and six processing plants of pig meat. Aveltis is one of the three main producer groups that supply Agromousquetaires slaughterhouses. The group has 620 pig producers with a turnover of €0.51 billion. The annual production is more than 3 million pigs (with 122 000 sows).

In 2015-16, together with a consultant, Agromousquetaires designed a structured OTC contracts for pricing pigs six months in advance. The six-month forward price is computed on a cost-plus formula based upon indicators of feed costs (futures prices of wheat and soybean meal on futures markets), technical yield ratios from feed to pig-meat and a level of fixed costs. The contract is offered for a five-year period where pig producers receive their six-month forward base price every three months (March, June, September and December). The forward price, adjustable to feed costs, is paid if the market price is stays within a tunnel. Market adjustment when the market price is going out of the tunnel have been discussed with the producer groups supplying the slaughterhouses.

Initially, when the first contracts were signed by producers in February 2016, the market adjusters were asymmetric in case of strong price decrease or increase compared with

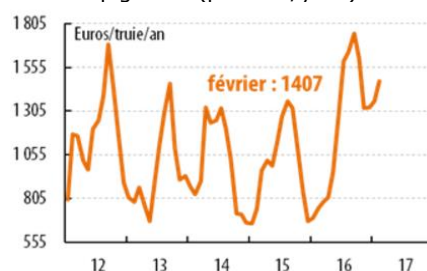
¹⁶ For instance, with a base price at 1.40 €/kg, if the market price is 1.55 €/kg, the compensation price paid by the producer to Herta is equal to $0.05 \times 100\% + 0.05 \times 75\% + 0.05 \times 50\% = 0.1125$ €/kg which is less than $(1.55 - 1.40) = 0.15$ €/kg

¹⁷ And a third smaller one dedicated to sows

the base price. The loss/benefit share between the producer and the slaughterhouse was different below and above the tunnel and the limits up and down of the tunnel were not symmetric with respect to the base price.

The interviews performed in March and April 2017 gave some information on the performance of the contract as the pig price had increased strongly since February 2016 (+ 37 % from 1.12 to 1.54 €/kg) and feed costs decreased in the meantime. As a consequence, the gross margin per sow increased heavily during 2016 and early 2017 as illustrated in Figure 8. The effective gross margin went rapidly outside the level of the predicted secured and capped margin offered by the structured OTC contract. As a consequence of the high increase of the producer margin, Agromousquetaires has been "obliged" to adapt the market adjuster for the upper limit of the tunnel for producers who had already contracted, and to continue attracting new entrants in the contract.

Figure 8 Indicator of gross margin in a French pig farm (per sow/year)



Source IFIP

Both parties to the contract are positive about its principles and wish to improve its first design, in particular for the market adjusting mechanism. Agromousquetaire said a public-private instruments dealing with extreme low pig prices would help to design more effective market adjusters. The long-term benefits are recognised: the contract provides visibility on the market return and allows the performant producers to invest with the support of bank loans. The banks are supporting this long-term contracting, even though the producer is limited by contract to a maximum of 50 % of his total supply.

"Sugar industry and Confédération Générale des Planteurs de Betteraves à sucre – CGB" risk management instruments and methods

Interview of Mr Pierre Rayé, Chief Economist, CGB, Paris and documents from the cooperatives Tereos, Cristal Union, Saint Louis Sucre, a subsidiary of the German cooperative Südzucker and British Sugar.

The sugar sector will be deregulated in September 2017. The production quotas as well as the minimum price of the sugar beet, as designed historically within the CAP, will disappear for the next year of production. In addition, the unique contract set by the national association of producers in order to define the conditions of pricing and payment of sugar beet will also disappear, as they are considered to be counter to the rules of competitive markets.

As a consequence, sugar groups and farmers supplying sugar beets are looking for new relationships, mainly new contracts for pricing such production. The industry is looking to secure its supply as production plants have heavy fixed costs. On the one hand,

producers need to secure the necessary volume¹⁸ of sugar beets required to minimise the cost of sugar and ethanol production. On the other hand, supplying farmers are primarily grain producers with some capacity to adapt their crop acreage based on (expected) future margin per hectare. Therefore, there is some risk of “acreage volatility” linked to relative futures prices between grains, oilseeds and sugar beet.

The sugar groups and organized groups of farmers are currently working on the design of multi-year contracts, which include acreage or volume features, quality adjustments, adjustments for early or late delivery, and also pricing mechanisms. Base price definition, market adjusters and formula for sharing added values are currently in discussion. In July 2016, British Sugar set a three-year contract for sugar beet supply, with a minimum price of 22 pounds/ton, and a bonus if the European sugar price is above a 475 €/ton trigger point (up to a maximum of 700 €/ton). The bonus is a 10 % share value for a one-year contract and 25 % for a three-year contract, capped to respectively 2.99 and 7.47 pounds/ton with respect to the duration of contracting.

To facilitate the design and the future life of multi-year contracts, the CGB is analysing the feasibility of an IST to deal with extreme variations of gross margin per hectare of sugar beet due to period of low value of sugar (and ethanol). Other equivalent instruments are also under investigation.

¹⁸ In order to process more sugar beets, plants are increasing the number of working days in the season. However, “early” sugar beets have a lower sugar composition and “late” sugar beets may lose their processing quality due to long storage on the field. Sugar plants are then obliged to compensate financially for lower qualities of “early” and “late” sugar beets.

4 Conclusion: implications of the case study in terms of public policy

The incompleteness of risk management instruments is a well-known market failure. A first requirement is efficient futures markets and the European Union has been partially successful in launching such markets. However, liquid futures contracts exist only for wheat, corn and rapeseed. The ICE sugar contract quoted in US dollar in London is also of interest to the sugar sector but the future basis risk between the domestic EU price and the futures price in London is still an open question. Many attempts to introduce futures contracts have failed (e.g. potatoes, pig carcass, piglets, brewing barley) or are very potentially close to failing (e.g. durum wheat). Dairy futures contracts are not yet liquid, although the latest market signals look positive for their development.

Many agricultural products do not fit the necessary conditions for the development of futures contracts in the EU, such as fruits and vegetables, wine, beef and poultry (at least, on a first approach of product definition or market structure). Forward contracting techniques may, therefore, be useful for securing farmers' margins and also those of other actors in the supply chain. The one-year horizon for short term production decisions and a multi-year horizon for investment decisions are both of interest. Industry is trying to develop price agreements for managing a bandwidth of price and margin variation.

This case study presents examples from agri-food sectors looking for long-term price agreements where markets are deregulated and assets, both from the producer and industry sides, are specific and large. The examples presented in the dairy sector, and the meat and sugar beet sectors, illustrate the capacity of the market participants to design such structured contracts.

The long "journey for designing and implementing efficient contracts" as often quoted during interviews is a way to present both the search for and the difficulty of implementing multi-year OTC price and margin contracts. It appears that the basic framework for contracts is quite similar across sectors; for example, in terms of defining a base price adjusted to variable costs of production, and limits of price variability, up and down. The contracts explored in this case study, illustrate the limits on the capacity of food chain actors to manage risk internally. Companies are therefore trying to design market adjusters that deal with extreme variations of prices and margins. These adjusters are usually designed to share high losses supported by one participant with the benefits accruing to another participant. The interviews reveal, however, support from different sectors for the idea of a role for partial public support through a specific instrument.

The case study draws two main implications for public policy:

1. The first implication relates to the development of a learning curve for designing and implementing long-term price agreements, and even short-term agreements when futures markets are missing. It is clear that food chains are willing to develop such agreements but initial transaction costs may be too large for satisfactory results.

2. The second implication relates to the potential of a public-private instrument to support the development of long-term price agreements. First of all, is it feasible? And, if so, how is it possible??

Mutual funds to stabilize farmer income (IST art. 39), which are up to now still in a research phase, may create an opportunity to complete food chain initiatives if they are built on common indices and thresholds for compensation. Traditional commodity programmes such as price intervention may also be of interest but should be redesigned in order to limit supply responses. Other public-private instruments may be designed to support the price agreement for first bandwidth of price or gross margin variation by private actors, such as hybrid contracts (revenue and margin insurance).

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- Mr Brian Hanafin, Risk Manager, Glanbia Ingredients Ireland (GII), Ballyragget, Co. Kilkenny, Ireland

- Mr Frédéric Chausson, Directeur Développement coopératif, SODIAAL, Paris, France
- Mr Maxime Jouannin, Risk Manager, SODIAAL, Paris, France

- Mr Wim Kloosterboer, Corporate manager Trade & Dairy Affairs, Friesland-Campina, Amersfoort, the Netherlands
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- Mr Patrick Faure, Industrial Director, Agromousquetaires, Vitré, France
- Mr Thierry Gallou, Director Aveltis (group of pig producers, 2 million pigs in 2016), Landivisiau, France

- Mr Arnaud de Belloy, Chairman, Herta-Nestlé, Noisiel, France
- Mr Daniel Bellec, Commercial Director, Porc Armor Evolution, Loudéac, France

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Annex II Definitions of main technical terms

Agricultural contracts: agreements between farmers and buyers that are reached prior to harvest or before production stage of livestock. They are usually split into two groups.

- "Production contracts" that specify services provided by a farmer for a contractor
- "Marketing contracts" that specify a quantity and quality to be delivered and a mechanism for determining the price when production is delivered. Forward contract (see below) is an example of marketing contract. Usually, long term marketing contracts specify a method or formula for determining prices at delivery date(s).

Futures market: Exchange where trading of futures contracts and options is organized. The futures markets are open for about a two or three years horizon but they are active (traded) usually up to a one-year horizon.

Futures contract: standardized contract by an Exchange. All characteristics are fixed except for the future month and the future price. Due to high number of contracts exchanged during a day, computed with a statistics called "volume" and a qualitative concept of liquidity, the bid-ask spread is very small. Due to the high number of participants, sellers and buyers, all public information is imbedded into the futures price. Low costs of transaction and use of all available information are allowing the futures price to be a fair market equilibrium price.

"Over The Counter" market or OTC market: market for physical delivery. It includes the spot market for immediate delivery (maximum a week) and the forward market. The forward market includes a long list of customized contracts for delayed delivery. The first and main example is the forward contract for one shot delivery.

Forward contract: customized contracts designed between a seller and a buyer. All the main contract attributes are set by the two parties, quantity, quality, date of delivery, location of delivery and price at delivery date. The forward price is usually derived from the future price as quoted for the same future period using price differentials due to quality differences, location, storage costs in between the forward contract date of delivery and the futures month of delivery. Service costs are also considered in the forward price. The forward contract presents similarities and differences with the futures contract. They both allow to fixing price in advance. The forward contract is better adapted to the need of the parties for physical delivery but there is no guarantee for correct execution and payment.

Farmers usually are not using futures contracts but rather forward contracts for selling their products in advance of delivery.

The forward market is common when there is a liquid futures market. When there is no futures market for a specific commodity, **it is common to use a "formula pricing" method** such as "spot price" in a physical market of reference plus a fixed premium (or discount) to take into account the quality delivered and the location of delivery. Such

contract does not provide forward prices but a systemic process for pricing deliveries on a long period (more than one-year).

Structured OTC contract: the contract is providing all conditions of delivery for a period of time. The pricing method is more complex than a forward pricing for a spot or multiple deliveries. Limits up and down can be added. Price premium conditionality can be introduced on thresholds for exchange rates or oil price. Basket of prices can be used in substitution of non-existing or illiquid markets.

Cost-plus contract: contract where price paid to farmers is set as the sum of variable and fixed cost of production, the value of his work and the value of the capital used. The price paid is adjusted periodically to the variable cost of production.

Symmetric and asymmetric tunnels (or bandwidth): cost-plus mechanisms provide base price for paying farmers. For managing risk, the contract define limit up and limit down around the base price with specific rules of payment (base price or market price). The limits up and down define "tunnels" or "bandwidth" that can be symmetrical or not with respect to the base price. The contract may also define rules of payment when market price is going out of the limits, up or down. They are called market adjusters.

Swap contract: a contract to exchange a variable price against a fixed price

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doi:10.2762/713691
ISBN 978-92-79-73710-7