Market incompleteness. The benefits of OTC contracts derived or not from futures markets

By Jean Cordier

Professeur Agrocampus Ouest, France

Meeting of the expert group on agricultural commodity derivatives and spot markets,

Brussels, April 18, 2018

OTC contracts derived or not from futures markets

Two studies

- « *Utilisation des marchés à terme par les acteurs commerciaux exposés à la volatilité des marchés de grains et du sucre* » (2016), Sigma Terme study for French Ministry of Agriculture, Paris, 135 p.
- « *Study on risk management in EU Agriculture* » (2017 – **unpublished**), Ecorys/Wageningen UR study for DG Agri, Brussels, 202 p. + 8 case studies
  - Case studies no 1 + 2 + 3 on climatic and sanitary insurance
  - **Case study no 4 on multiannual price risk management (OTC contracts)**
  - Case study no 5 on mutual fund art. 68 (production risk)
  - **Case study no 6 on mutual fund art. 69 (Income stabilisation Tool)**
  - Case study no 7 and 8 on the US and Canadian risk management system

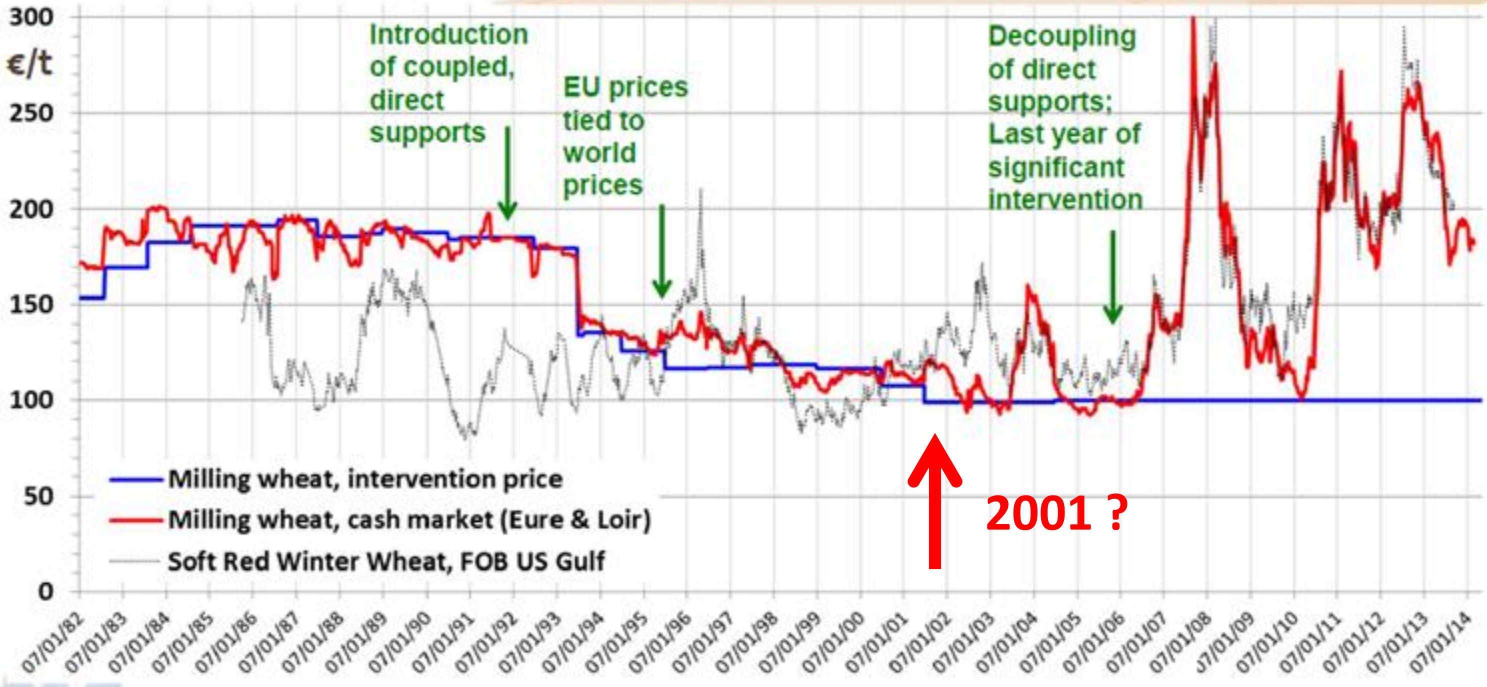
Two horizons for price risk management by OTC contracts

- One year : production cycle
- Multi year : investment cycle

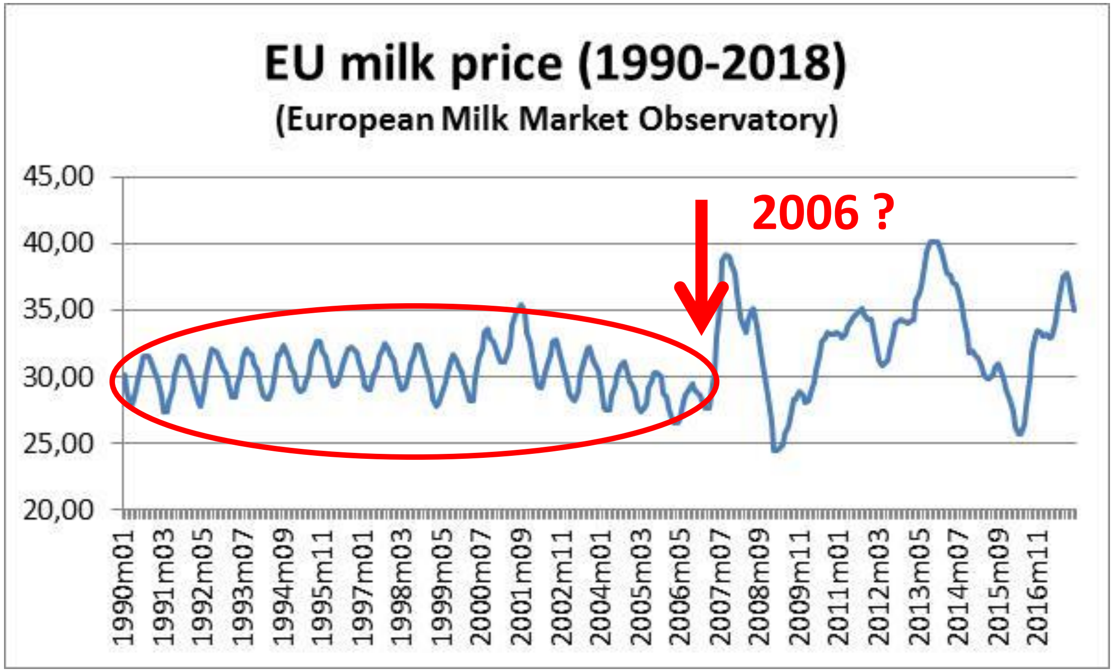
OTC contracts derived or not from futures markets

1. **Market incompleteness => a need for public policy**
2. **OTC contracts with futures markets**
3. **OTC contracts without futures markets**
   - Spot price formulas
   - Price swaps
   - Margin swaps
   - Limits of swaps
4. **Implication for a public policy**
   - Measures for reducing market incompleteness
   - Instruments to support contract durability

European farmers have been only recently exposed to volatility



N. Ferenczi, Ulysses 1st International Seminar, 27 March 2014


EU milk price (1990-2018)
(European Milk Market Observatory)
2006 ?
45,00
40,00
35,00
30,00
25,00
20,00
1990m01
1991m03
1992m05
1993m07
1994m09
1995m11
1997m01
1998m03
1999m05
2000m07
2001m09
2002m11
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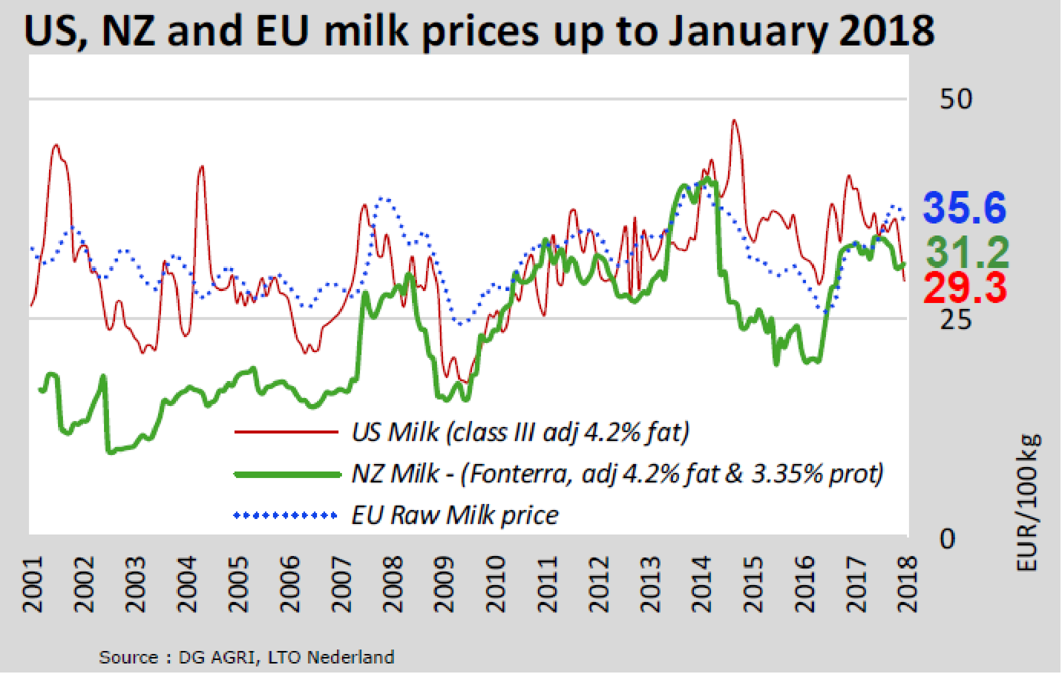
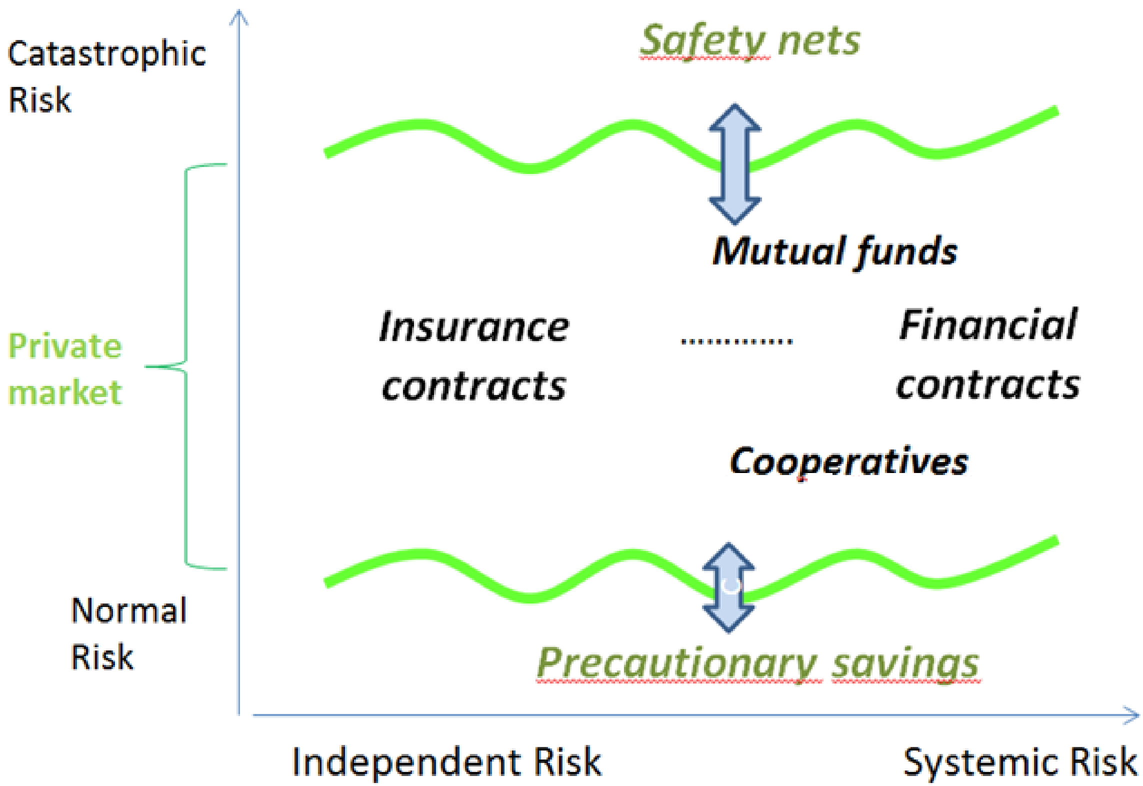
2014m07
2015m09
2016m11


US, NZ and EU milk prices up to January 2018
50
35.6
31.2
29.3
25
0
EUR/100kg
US Milk (class III adj 4.2% fat)
NZ Milk - (Fonterra, adj 4.2% fat & 3.35% prot)
EU Raw Milk price
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Source : DG AGRI, LTO Nederland

Risk management instruments



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

Case study no 4: Multiannual price risk management (unpublished)

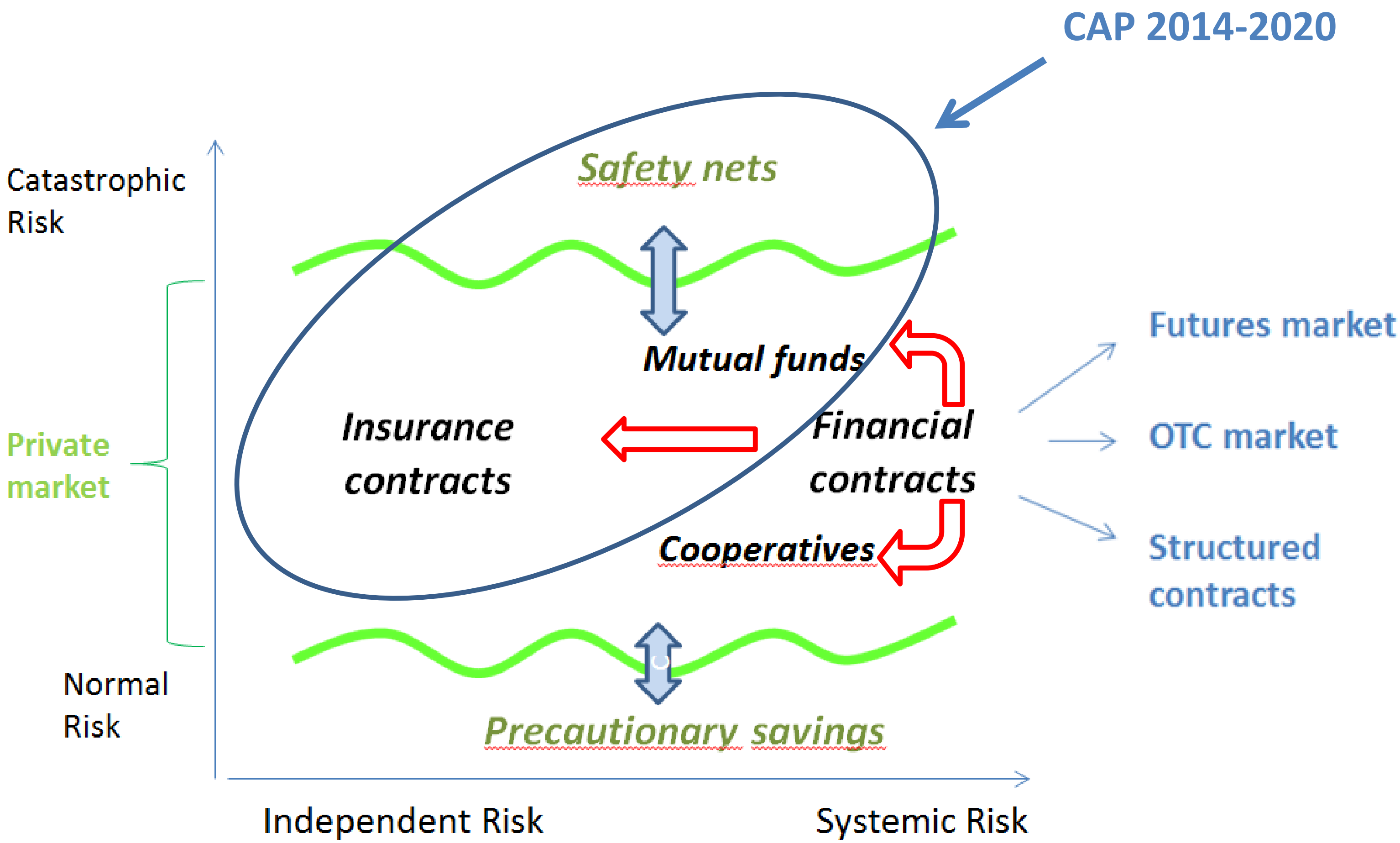
1. Market incompleteness

- Sub-optimal production decisions (types and means of prod.)
- Sub-optimal investment decisions (technology adapt., lack of credit)

  => **Loss of productivity and competitiveness**

- Few liquid futures markets on EU agricultural products (wheat, maize, rapeseed, sugar)
- Insurance contracts in EU countries but with low uptake rates
- Cooperatives are major risk management instruments in some EU Member States
- A risk management toolkit within CAP 2014-2020 that failed due to various constraints … and farmers' fear of budget transfer
- 72 % of the EU agricultural budget spent on direct payments to support farmers income. **But direct payments are not a risk management instrument.** Just a wealth effect that may allow risk taking.

1. Market incompleteness



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

Case study no 4: Multiannual price risk management (unpublished)

2. OTC contracts with futures markets

Contracts on futures markets	Futures contract (elicitation of future prices)
	Options on futures contract (elicitation of future volatility)
OTC cash contracts	**Basic OTC contracts**
	Spot contract (spot price)
	Forward contract (forward price = futures price and basis fixed)
	Basis contract (fixed basis value, futures price to be fixed)
	Hedge To Arrive (futures price fixed, basis to be fixed)
	Minimum price contract (option derivative = call or synthetic call)

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	Minimum price contract (option derivative = call or synthetic call)
	Structured contracts
	Pool price contract (offered by cooperatives)
	Market price average on specific periods
	Tunnels, participative and exotic options (kickout, lookback, …)
	Contracts on margin (insurance hybrids)

2.1. Use of contracts by farmers

- Survey of financial intermediaries (2016) : estimated 2 000 active accounts for 300 000 grain farmers in France => less than 1%

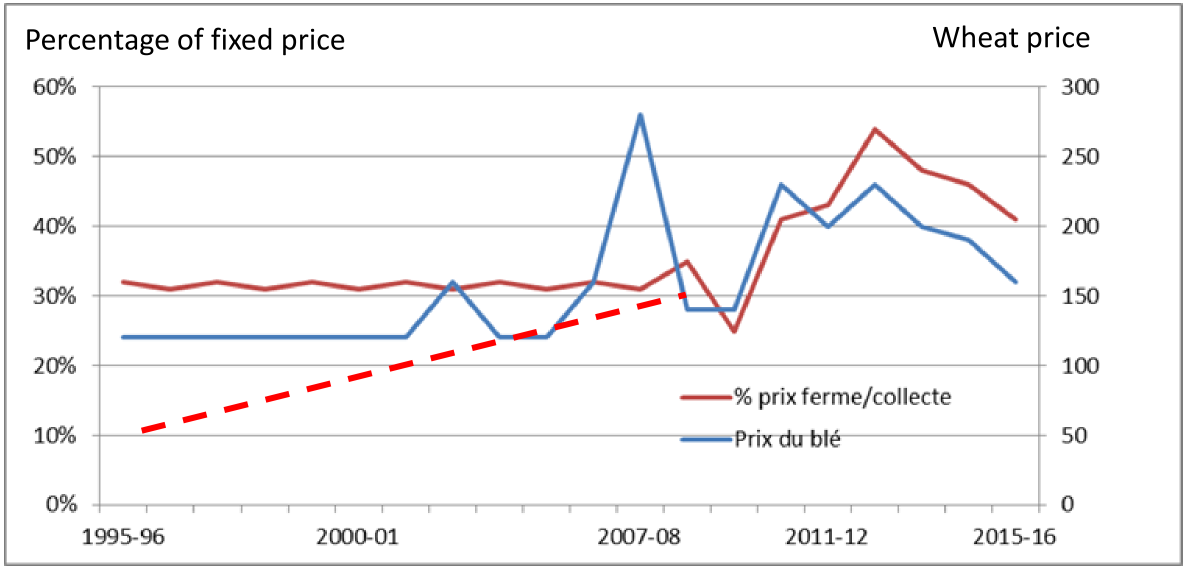
  => Marginal direct use of futures markets by farmers

- Dominant pooling price through cooperatives (60%)

  … but benchmark from futures markets (computed average prices)

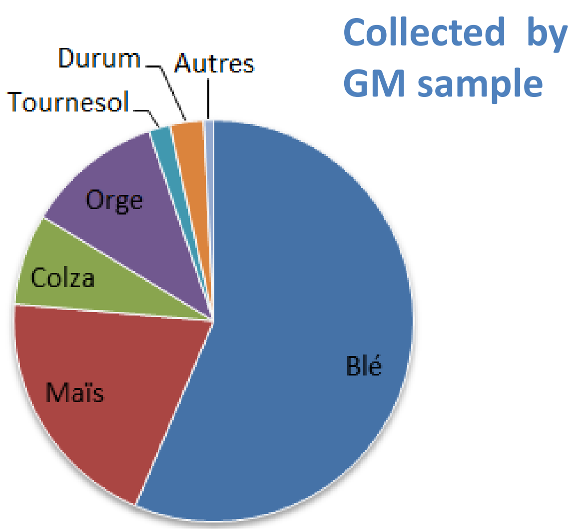
- Farmers diversified between « basic » and « structured » contracts

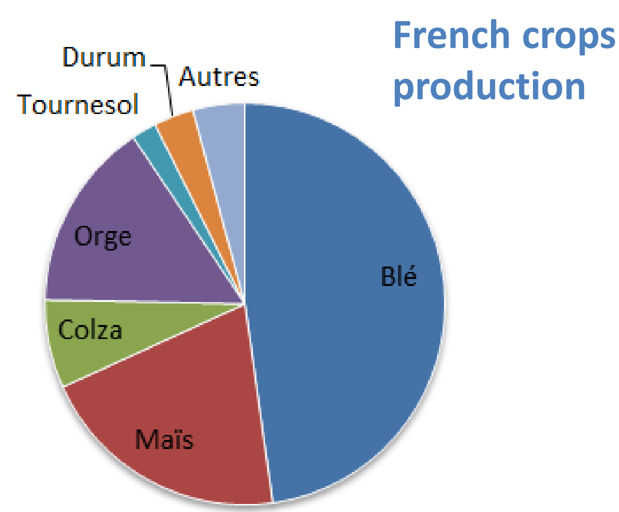
Estimated change in % of fixed price with respect to market price



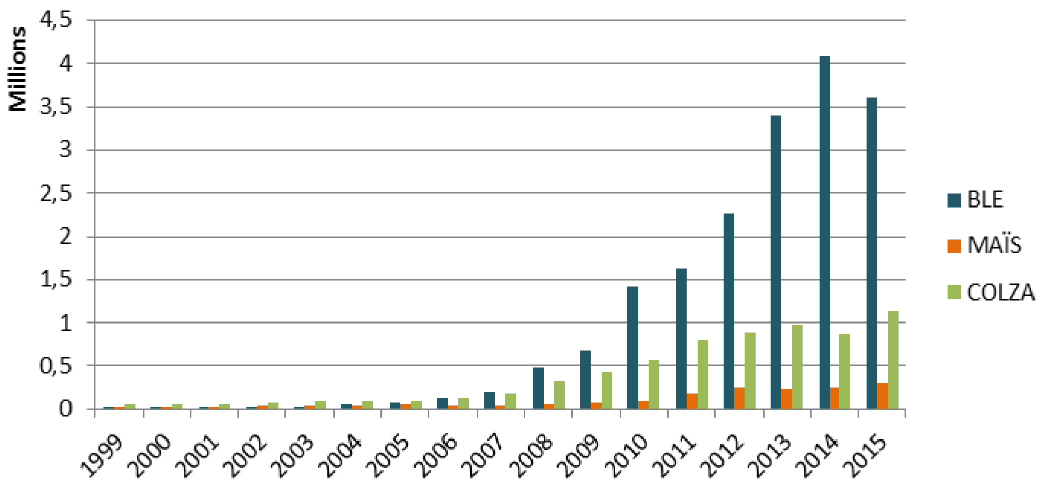
Source : auteur

2.2. Use of contracts by Grain Merchandisers (GM)





Source : Auteur



Source : Auteur sur données Reuters

<u>Futures contracts MATIF</u>

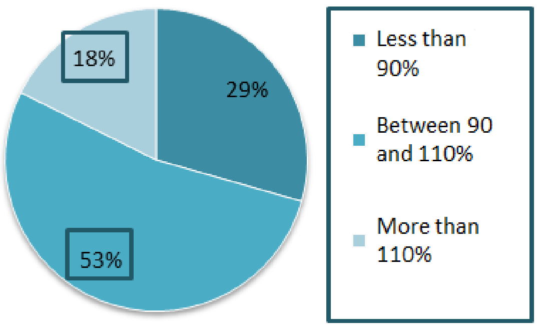
- Rapeseed 1994
- Wheat 1996
- Corn 1999

Use of contracts by Grain Merchandisers

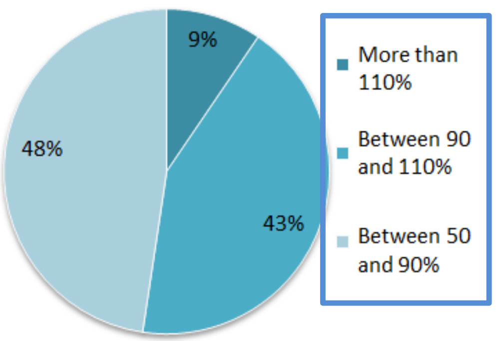
Contract name	Delivey	Price elicitation	Percentage of use w.r.t. total crop
Basis contract **(« Against Actuals »)**	Differed	Basis fixed « Against Actuals » = swap of futures position in exchange for cash positions (governed by exchange rules)	61%
Fixed price contracts	Spot Differed Multiple delivery	Futures price + basis	22%
Delayed pricing contract	Differed	Fixed volume and quality Fixed storage costs	14%
Various indexed contracts	Differed	Fixation partielle ou totale et différée, indexée sur le MATIF	1%
Tunnels/options/other structured contracts	Spot Differed	Structured prices	2%

Use of futures contracts by Grain Merchandisers

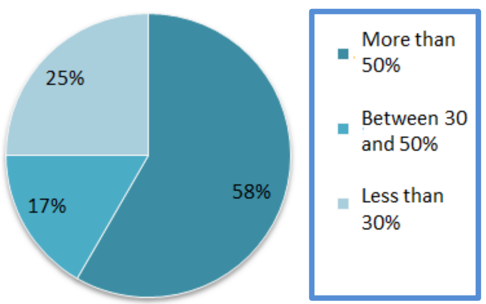
Rapeseed contract
- 102 % of weighted crop hedged
- 71% of GM hedge more than 90%



Wheat contract
- 98 % of weighted crop hedged
- 52% of GM hedge more than 90%



Corn contract
- 43 % of weighted crop hedged
- 58% of GM hedge more than 50%



Production cycle with futures markets (in France)

- From the farmer situation
  - More pooling price than fixed price
  - Indirect use of futures markets (information and OTC contracts)
  - Diversified marketing strategies
  - Impact of low or high prices on portfolios
- From the grain merchandiser situation
  - Large use of futures markets (mainly with « Against Actuals »)
  - Strong issue of basis risk and price convergence
- From the end user situation (feed, crush, milling, processing)
  - Large use of futures markets (also using « Against Actuals »)
  - Strong demand of AA (liquidity, transaction costs, secrecy)

Therefore:

- Futures markets are required as reference markets (grain, dairy, livestock, fertilizer, index, …),
- OTC markets are developing with contract innovation,
- **It takes years for the learning process** when shifting from regulated to competitive markets.

Message

- About twenty years of maturation on the grain market in France (1997-2017) = **a success but a long process**
- Still questions on hedging performance
  - maize (Rhine and Atlantic market)
  - Basis volatility … and adequate convergence
- Limits of cross-hedging
  - malting barley, durum wheat, sunflower, rapeseed meal, …
  - Dairy products versus milk farmgate price
  - Sugar/ alcohol versus sugar beet

3. OTC contracts without futures markets

- Examples
  - spot price formulas
  - price swaps
  - margin swaps
- The limits of swaps

3.1. Spot price formulas (examples)

- Formula pricing:

The effective price paid to farmers is computed periodically using spot signals and a calculus formula

- FrieslandCampina (NL):

The average EU milk price as observed weekly on a panel of dairy companies is paid to cooperative members as a minimum price. An annual bonus may be added in relation with the cooperative efficiency

- Sodiaal (FR):

« Price A » for « Volume A », the EU domestic demand based upon European references on consumer and industrial products and « Price B » for « Volume B », the international market (mainly industrial products).

- Etc.

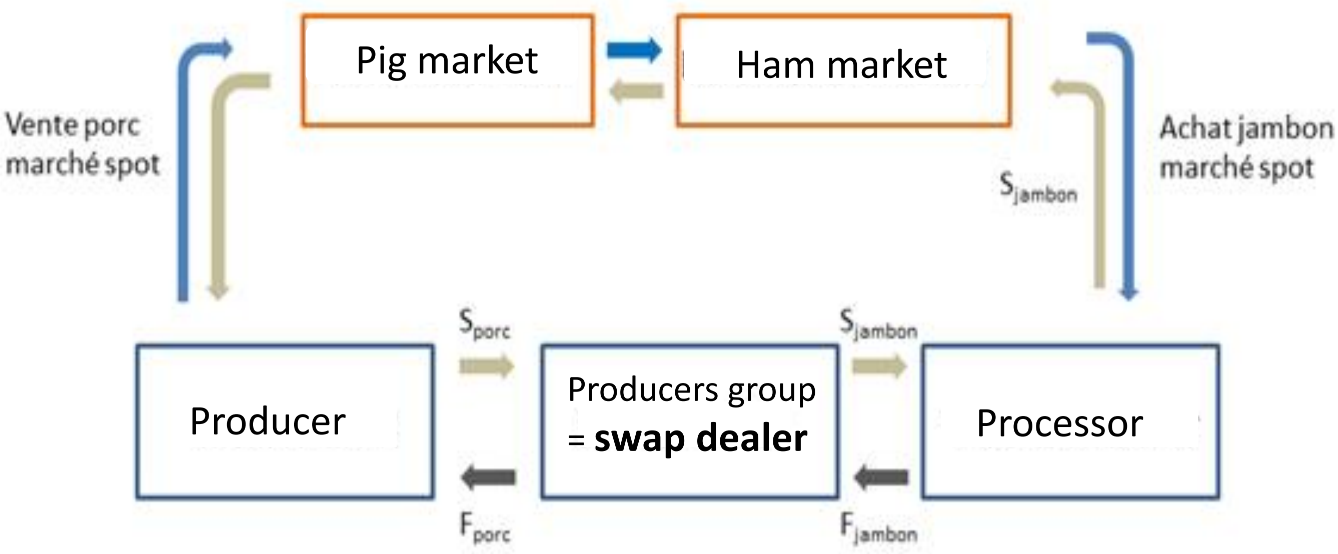
Comments:

- Widely used: a broad set of contracts
- Market references required
- Limited price risk management
- Potential for improvement (futures markets with OTC derivatives <u>or</u> swaps)

3.2. Price swaps

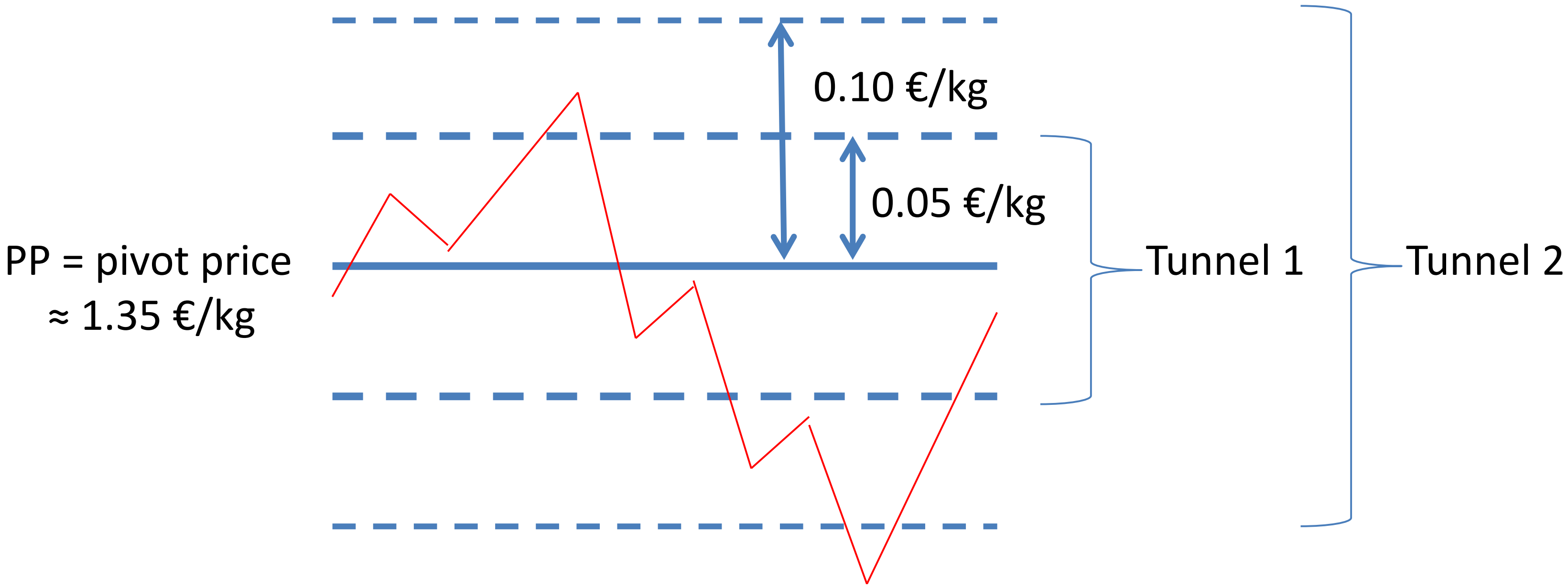
Swap = fixed price against (volatile) market price

Example Herta – Porc Armor Evolution



- **Principle** = Opposite market risks within the food chain
- Pure financial contract
- One year contract (potential for multi-year contract)
- Limited output percentage of pig producer

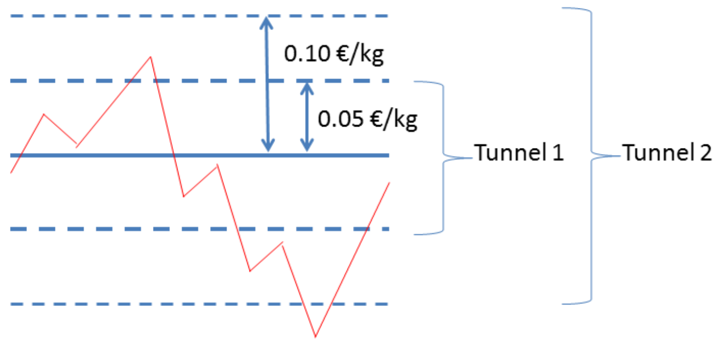
Practically



- Tunnel 1 = PP +/- 0.05 €/kg
- Tunnel 2 = PP +/- 0,10 €/kg

Compensateur : HERTA			Compensateur : éleveur	
< PP-0,10	-0,10<=PP<-0,05	-0,05<= PP<=+0,05	+0,05<PP<=+0,10	>PP+0,10
		compensation :		
50%	75%	100%	75%	50%

Practically



- Set PP = 1.35 €/Kg
- Market price (MP):
  - Case 1: MP = 1.38 €/Kg (within tunnel 1)

    Producer is paying (100% x 0.03) = 0.03 €/Kg to Herta
  - Case 2: MP = 1.28 €/Kg (within tunnel 2)

    Herta is paying (100% x 0.05) + (75% x 0.02) = 0.065 €/Kg
  - Case 3: MP = 1.21 €/Kg (out of tunnel 2)

  Herta is paying (100% x 0.05) + (75% x 0.05) + (50% x 0.04) = 0.1075 €/Kg
  - Symmetry of the contract (caps and floors)

3.3. Margin swaps

Swap = fixed margin against (volatile) market margin

Examples: Glanbia / milk and Agromousquetaires / pig

- **Principle** = opposite market risks within the food chain
- Price formula pricing for a stabilized margin
- Multi-year contracts (three to five years)
- Limited output percentage of pig producer

- **The processor is paying the price for a fixed producer margin with respect to a volatile input costs**
- The input costs considered are operational random costs (basically feed costs)
- Feed costs are computed ex post (Glanbia) or ex ante (Intermarché) using futures markets

Practically: Glanbia (IRL) margin swap
The Fixed Milk Price scheme (Glanbia-FMP)

- Glanbia: dairy cooperative (16,000 members)
- « *Price volatility, a key market challenge* »
- Four complementary instruments (FMP, flex loan repayment, advance payment scheme, coop specific support)

- Phase 8 (since 211) = **« *a long journey* » to design OTC contracts for price risk management**
- A three-year contract (now five years)
- Each month, Glanbia is fixing the milk price P to producers
- P = Feed **indexed** costs + Fixed costs + « *Protected* » producer Margin
- Feed costs = f ($S_{purchased\ feed} + S_{local\ forage}$) with S spot prices
- Glanbia is backing the margin swap with contracts with final users of industrial products (butter and skimmed milk powder)
- Glanbia is providing a « market adjuster » in case of extreme events (loss share 50/50)

Practically: Agromousquetaires margin swap

- Agromousquetaires: 10 food chains (60 plants with 19 700 farmers) of food stores « Intermarché ». Dairy, pig, beef, biscuits, fish, …
- March 2017 =>  producers/prod. group/Agromousquetaires
- A five-year contract / Max 50% of individual pig production
- Each 1st day of trimestre, Intermarché is fixing the price for pigs to be slaughtered six months later (i.e. January for June-July-August)
- F_{pig} = **Indexed** feed costs + Fixed costs + Fixed Margin
- Feed costs = f ($F_{wheat} + F_{sojameal}$) with F futures prices of wheat/sojameal
- If fixed pig price as formula priced is inducing much higher margin than market margin, there is a « **market adjuster** » based on **cash advance** by Agromousquetaires
- To be extended to other food chains

General message of price and margin swaps

- There is a capacity (and a willingness) of the food chain to manage price risk (price smoothing by risk exchange)
- Need to choose the right partners (**direct relationship** Herta/Porc Armor and AgroMousquetaires/Aveltis-Prestor or **back-to-back** contracts Glanbia)
- Need for quality of signature for contract integrity (swap dealer job)
- Major role of producers groups (training, quality of signature)
- Requirement of « market adjusters » in case of extreme market situations
    - Gain/loss rate of participation
    - Cash advance
    - Other ?

4. Implications for a public policy – Conclusion

- OTC contracts are major instruments for price risk management (for both production and investment cycles)
- Traditional **futures markets are necessary** (when feasible)

Required public policy: « **public market information = quantity, quality, up-to-date** »

Crucial = DG Agri Market Observatories, Dashboards and Outlook

Sujet		Expéditeur		Date
Agricultural market dashboards - MILK AND MILK PRODUCTS		agri-newsdigest@ec.europa.eu		13/04/2018 15:40
Agricultural market dashboards - OILSEEDS		agri-newsdigest@ec.europa.eu		13/04/2018 15:20
Agricultural market dashboards - CEREALS		agri-newsdigest@ec.europa.eu		13/04/2018 15:10
EU Meat Market Observatory (Meat MO) Template update - 13/04/2018		agri-newsdigest@ec.europa.eu		13/04/2018 10:10
Agricultural market dashboards - BEEF		agri-newsdigest@ec.europa.eu		13/04/2018 10:00
Agricultural market dashboards - SHEEP MEAT		agri-newsdigest@ec.europa.eu		12/04/2018 10:50
European Milk Market Observatory - update		agri-newsdigest@ec.europa.eu		12/04/2018 10:30
EU Meat Market Observatory (Meat MO) Template update - 12/04/2018		agri-newsdigest@ec.europa.eu		12/04/2018 09:50
Agricultural market dashboards - PIGMEAT		agri-newsdigest@ec.europa.eu		12/04/2018 09:30
Agricultural market dashboards - POULTRY MEAT		agri-newsdigest@ec.europa.eu		11/04/2018 17:20
Agricultural market dashboards - EGGS update		agri-newsdigest@ec.europa.eu		11/04/2018 17:10

1 = almost up to date

DG AGRI DASHBOARD: DAIRY PRODUCTS

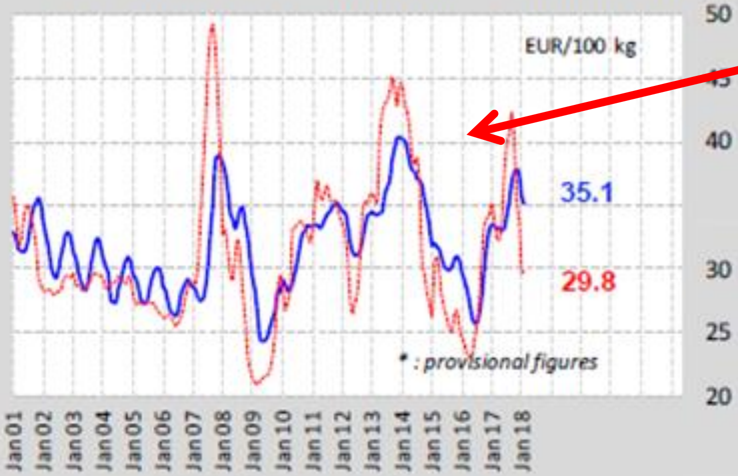
Last update : 04.04.2018

EU Prices

	EU Price Jan-2018		Evolution since
Raw Milk	35.6	€/100 kg	- 4.7%

	EU Prices (week 13)		Compared to the previous 4 weeks
BUTTER	487	€/100 kg	+ 1.2%
S.M.P.	132	€/100 kg	- 0.9%
W.M.P.	261	€/100 kg	+ 0.3%
CHEDDAR	327	€/100 kg	+ 0.9%

EU Raw Milk Prices Evolution (up to February 2018*)



2 = data base for reference

World Quotations

LATEST WORLD QUOTATIONS

	Price in USD/Tonne on 1.04.2018			% change (15 days ago)		
	EU	Oceania	USA	EU	Oceania	USA
Butter	6 071	5 275	4 828	+ 3.6%	- 0.9%	- 1.0%
SMP	1 626	1 938	1 531	- 0.8%	+ 4.0%	+ 0.5%
WMP	3 210	3 225	3 252	+ 0.3%	- 0.4%	nc
Cheddar	3 980	3 625	3 390	- 0.2%	- 4.9%	- 1.9%

US, NZ and EU milk prices up to January 2018

3 = world wide

4. Implications for a public policy – Conclusion

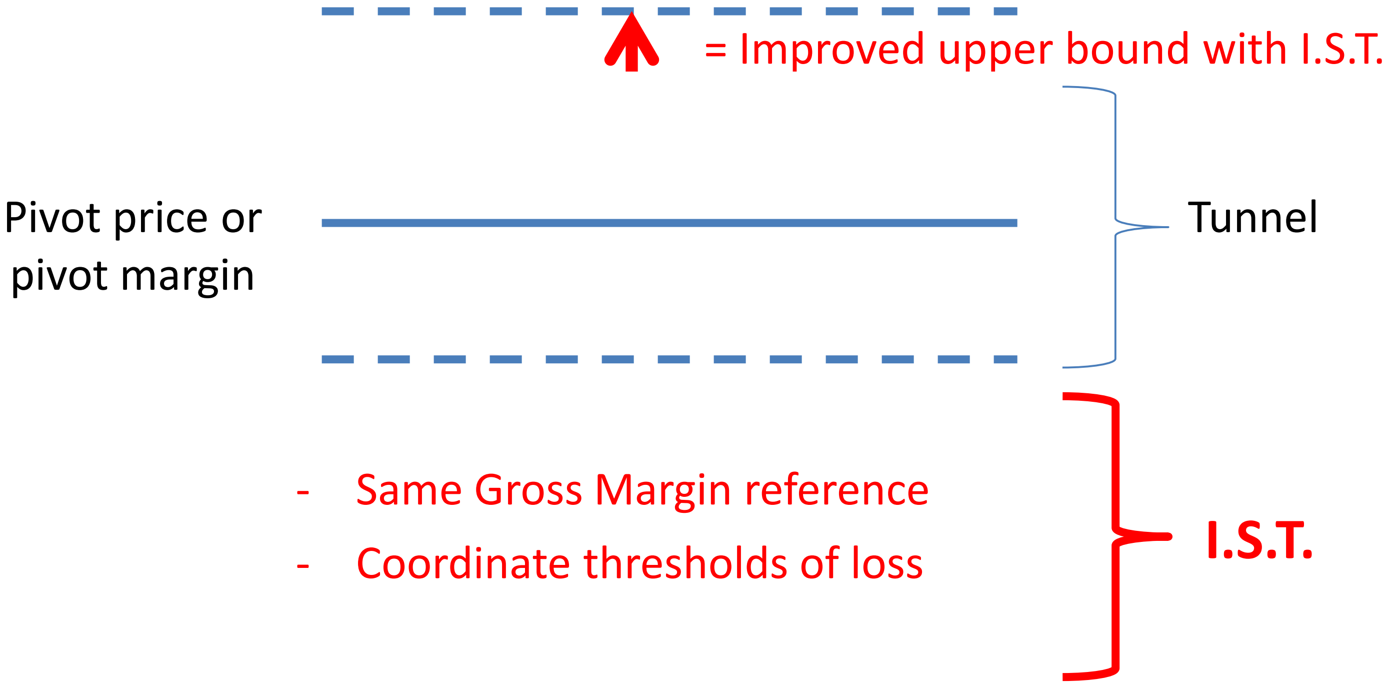
- OTC contracts are major instruments for price risk management (for both production and investment cycles)
- Traditional futures markets are necessary (when feasible)

Required public policy: a **public market information = quantity, quality, up-to-date**

- A great innovative capacity of food chains to manage price risks through swaps (with or without futures markets)

Required public policy: **integrated mutual fund IST art. 39** for (1) OTC contract durability and (2) design improvement

Improvement and durability of Swaps (OTC contracts)



A great need of sharing projects, studies and experiences
= the expected EU platform on risk management

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Required public policy: the development of an **EU platform on risk management**

  - the actuarial model of mutual funds (IST) => fair competition
  - common market references (public infor. system)
  - share of studies, projects and experiences

Thank you for your attention