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Baptiste Lelyon, Vincent Chatellier, Karine Daniel

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Abolition of the EU milk quotas and dairy farmers’ productive strategies

Implication for the dairy farmers’ in the West of France?

Baptiste LELYON\(^{(1)}\) - Vincent CHATELLIER\(^{(2)}\) - Karine DANIEL\(^{(2,3)}\)

\(^{(1)}\) Institut de l'Elevage, GEB, Paris (France)
\(^{(2)}\) INRA, UR 1134, LEREKO, Nantes (France)
\(^{(3)}\) ESA, LARESS, Angers (France)
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1- Context and objectives
BIG-BANG in the dairy world

- Towards the end of the milk quota (2015)
  - 1984-2008: milk supply control = stable income
  - Why?... economical inefficiency (Colman, 2000)

- The strong prices variation
  - For milk... but also for cereals and inputs

- Milk strike in France and Belgium
  - Two weeks of demonstrations

- Solution: contract between producers and dairy processors
The west regions: 45% of the French dairy production

The dairy farms (in western regions)

- 40,000 dairy farms
- A low productivity (150,000 kg of milk per Annual Work Unit)
- A diversity of technical systems (with a large importance for maize)

Source: ONILAIT
A model to reach two objectives

1. Better understand and anticipate the implications of the Health Check on the dairy farmer supply behaviour... with taking price variations into account

2. Evaluate the impact of scenarios of removal of milk quota: Contractualisation “double volume – double price”

- A linear programming model
  - Maximise the income
  - Represent the complexity of the production system
  - Consider at the same time production, price and policy information
2- The model
A Model to represent a “realistic” dairy operation

- The feeding system and the forage production are linked
  - Rations are determined by nutritional requirement (Groen, 1988; Shalloo et al, 2004)
  - Surfaces (ha) and production quantity (kg) are dissociated

- The milk yield/cow is not constant (Peyraud, Faverdin, 2009)
  - The farmer can produce in a range of 1000 litters below the cow genetic potential (1 liter of milk = 0.44 energy unit and 48 protein units)
  - Above the genetic potential, the milk yield is decreasing (1 liter of milk = 1.4 energy unit and 120 protein units)

- The crop yield depend on the nitrogen used (Godard et al, 2008)
  - ...but the relation between nitrogen and yield is not linear
  - Several sources of nitrogen are considered: manure, slurry, chemical
4 periods are taken into account

- The seasonal specification of grass production (yield and composition, Berentsen et al, 2002)
- The allocation of the Working force

The model integrates the risk aversion to price variations

- The Utility Efficient Programming (UEP) method maximise the expected utility of the income...with a minimisation of its variability (Hardaker et al, 2004)
The model optimise the following variables…

- Number of each type of animal  
  - Dairy cows, calves, heifers and young bulls

- Milk yield per cow

- Feed composition (forages et concentrates)  
  - Pasture, grass silage, hay, maize silage
  - Wheat, Soya, rapeseed, production concentrate, milk or milk powder for the calves

- Crop rotation and nitrogen quantity  
  - Grassland, maize, wheat, pea and rapeseed

- Cereal production sold or home consumed
The model is applied for four types of farming

- **Milk + young bull** (100 ha, 400 000 l of milk quota)
  Intensive, maize feeding system, milk yield (8000 to 9000 l/cow)

- **Milk + cereals** (137 ha, 460 000 l of milk quota)
  Intensive, maize feeding system, milk yield (7500 to 8500 l/cow)

- **Semi-intensive** (50 ha, 290 000 l of milk quota)
  Small area, maize and grass, milk yield (7500 to 8500 l/cow)

- **Grazier** (78 ha, 285 000 l of milk quota)
  Extensive, based on grass, low milk productivity (5000 to 6000 l/cow)
3- Results
Two considerations before our simulations

Some studies exist already (partial and general equilibrium model)

(Westhoff, 1998; Bouamra, 2008; Kleinhanss et al, 2002)

- The milk production increases (7 to 10%)...
  ... but the price decreases (21 to 26%)

Milk price (€/ton)

The model assumptions

The main assumptions in our model

• Base year 2007 (with full implementation of 2003 CAP reform)

• Farmers have the possibility to increase the number of cows by 10% and +50% for the milk + young bull farm (substitute young bulls by cows)

• Contract double volume / double price
  • Volume A : historic quota with a fixed price (280 €/ton)
  • Volume B : price lower and more variable

\[
\text{Milk Price Volume } B = 280 \times \left( 1 - \left( \frac{\text{Volume } B}{\text{Volume } A} \right) \times \alpha \right)
\]

\(\alpha\) is the elasticity coefficient in order to avoid over production
- Dairy farmers react to different price conditions
- High production potential
High production potential with low prices

- Agricultural area of West of France farms increased by 52% for the last 10 years while the quota per farm increased by only 28%
  - Diversification of the agricultural production

- Equilibrium price for volume B
  - Grazier: 160 €/t
  - Semi-intensive: 189 €/T
  - Milk + cereals: 192 €/t
  - Milk + young bull: 196 €/t
How to produce more milk?

- More cows
- More milk per cow → with (a lot) more concentrate
- Less young bulls and less home produced milk for calves
How to produce more milk? (impact on crop rotation)

- To feed the animal to produce milk: increase of the forage area
  - Decrease of cereals area
  - The maize area increase
A better income but…

- Income increases proportionally less than milk quantity:
  - additional variable costs (dairy cows, concentrates)
  - losses (cereal crop replaced by forage productions)

Impact of milk quota abolition (on economic results)

0% 2% 4% 6% 8% 10% 12% 14% 16%

Income

Grazier  Semi-intensive  Milk+cereals  Milk+Young Bulls

0% 2% 4% 6% 8% 10% 12% 14% 16%

Volume B / Volume A

Grazier  Semi-intensive  Milk+cereals  Milk+Young Bulls
The production in volume B is function of the milk price in volume A which guaranty the economic durability of the farm (fixed costs).

Lower price: competition with cereal production.
4- I need your help!
Contract by the dairy processors

- **Volume A**: 80% of the historic quota
- **Volume B**: variable and lower price

- **The volume A (80%) must guaranty 90% of the reference income for farmers**
  - Security margin for the farmer
  - Cover the fixed costs engaged for a more important production
  - Give the choice for the farmer to produce (or not) milk in volume B
Guaranty 90% of the income with 80% volume

Which milk price in volume A to assure 90% of the income

- If apply a rule of 3:
  - 80% volume → 90% income
  - Milk price for volume A: **322€/ton** for the four type of farming

- Great difference if we run the model:
  - **Grazier 355€/t**: very rigid system, no possibility to develop other production with the free area
  - **Semi-intensive 315€/t**
  - **Milk+Cereals and Milk+Young bulls 295€/t**: those types of farming can develop cereal and beef production with the free lands

322€/t for all the type of farming: not possible to give different prices for the volume A
### Quantity and equilibrium price in volume B

<table>
<thead>
<tr>
<th></th>
<th>Grazier</th>
<th>Semi-intensive</th>
<th>Milk+cereals</th>
<th>Milk+Young bulls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equilibrium price for volume B</strong></td>
<td>180,8</td>
<td>208,2</td>
<td>212,8</td>
<td>205</td>
</tr>
<tr>
<td><strong>Milk production in volume B</strong></td>
<td>43 500</td>
<td>33 000</td>
<td>50 500</td>
<td>47 100</td>
</tr>
<tr>
<td><strong>Global production (A+B) / historic quota</strong></td>
<td>95 %</td>
<td>91 %</td>
<td>91 %</td>
<td>92 %</td>
</tr>
</tbody>
</table>

Price are a little higher than the previous simulation (+15€/t)...

... but the global production (A+B) is lower than the historic quota

Problem with the elasticity coefficient (I kept $\alpha = 3$)
How to get a good elasticity coefficient?

- The volume A is lower than the historic quota
- The milk price in volume B has to be function of the volume B (decreasing)
- How to decrease the price in volume B if the global production (A+B) is lower than the historic quota (normally the price decreases only if the volume is higher than the reference)

How to determine the elasticity coefficient

- $\alpha$ constant but lower
- $\alpha$ linearly increasing
- $\alpha$ non linearly increasing
We need $\alpha$!

Increase in milk production for a milk price in volume B: **210€/t**

- Without $\alpha$ the production potential is very important
- Farmers try to saturate the production constraints (building for the semi-intensive and milk+cereals; land for the grazer and the milk+young bulls farm): **the milk price is stable given any volume produced**
- The milk price cannot be constant with a great increase in volume
5- Conclusion
Conclusion

- This model enables to discuss
  - The dairy farmers’ behaviour face to new rules for the CAP
  - The substitutions between productions under price variations
  - The impact of different constraints on the farmers strategies

- Some improvements are necessary
  - The way how farmers anticipate prices
  - Four types are not enough to represent the global diversity of systems

- The end of the milk quotas: an important public decision
  - The distribution of the milk production between regions
  - The restructuring of farms and its environmental impact
  - The way to control the milk supply (from public regulation to private)
Thanks for your attention
Impact of milk quota abolition (on environmental indicators)

- Intensification of the dairy production
- Low impact on environment: increase of the forage area
  cows replace young bulls

Abolition of the EU milk quotas and dairy farmers’ productive strategies

16-17 November 2009
Very different working conditions

- Semi-intensive and Milk+cereals: income increase proportionally less than the additional work
  - Additional cows and forage area
- Grazer and Milk+young bull: more room of manœuvre (milk yield and decrease of the nb of young bull)
The constraints to produce milk

- The most important constraint: the milk yield per cow
- Economic gain permitted by the genetic level of animals: a higher quantity of milk at a lower cost

Abolition of the EU milk quotas and dairy farmers’ productive strategies 16-17 November 2009
Competition with cereals

Evolution de la part des céréales dans la SAU en fonction du prix des céréales

% des céréales dans la SAU

Prix des céréales €/t

Herbager
Semi-Intensif
Lait+céréales
Lait+JB
Contractualisation double volume : discussion

How to manage the volume A

- Price
- Length of the contract (time): dairy production is a long cycle activity
- Volume and volume transfer between farmers (no more link to the land)
  Free attribution to farmer according to criteria: milk quality, volume, collecting distance...
  Progressive replacement of volume A by volume B

How to manage the volume B

- Price (fixed price, variable price)
- Production planification during the production season (distribution between volume A and B)