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RESEARCH IN ECONOMICS AND RURAL SOCIOLOGY

The mid-term CAP reform (June 2003) and French cereal farms in the intermediate regions

Using a regional model optimizing farmers' agricultural income subject to a set of constraints, while also simulating the evolution of farming structures in the period 2002-2012, the impacts of the Luxembourg compromise on farm incomes and agricultural structures, the cropping pattern and agricultural decline (idle land) are here analysed with regard to cereal production in intermediate regions. Simulations show little risk of agriculture decline: a loss of 8% farms if cereal prices drop considerably, to 81€ by 2012. A recoupling of 25% of the aids makes this decline disappear in this price scenario, which supposes a drop in the intervention price. Following the Luxembourg compromise, the maintenance of the intervention price should impede such a fall in prices and so naturally slow down the decline. While the final "Fischler" proposals (scenario 1) would have entailed major drops in farm incomes per hectare and farm, the Luxembourg compromise (scenario 2) should allow for the levelling off of farm income (inflation rate of 1.4%), bearing in mind that according to the model 12% of farms closed down by 2012. Decoupling evens up cereals and oleaginous production, which is not surprising since aids coupled by crop have been identical since the Agenda 2000 implementation.

Research object

Scheduled for 2005 at the earliest, agricultural policy reform was scheduled in three big phases: a first proposal from the Commission in July 2002, then an adaptation of that proposal in January 2003 which already greatly reduced its economic impact, and finally, in June 2003, the Luxembourg agreement between member states. To provide data to the Ministry of Agriculture and the farming profession, simulations were conducted "ex ante" for cereal farms in intermediate regions, sensitive to agricultural policy changes. They were carried out using a sequential regional model of linear programming, optimizing farmers' yearly incomes over the period 2002-2012 and integrating structural evolutions. Thanks to this tool we were able to study the effects of the reform on: a) the cropping patterns and in particular on the respective shares of the cereals and rotation heads, b) the farming incomes per hectare and farm, c) the risk of decline, d) the evolution of the number of farms and their structure.

Table 1: Average characteristics of the sample in 2002

Area (ha)	155
Yield (q)	73
Rapeseed yield (q)	33
Wheat price €/q	9.5
Rapeseed price €/q	19.8
Gross wheat margin €/ha	729
Gross rapeseed margin €/ha	678
Variable costs €/ha	286
Gross margin €/ha	692
Fixed costs €/ha	546
Farm income €/ha	146
Coupled Premium €/ha	346

Cereal farms in intermediate regions

Cereal farms in intermediate regions, mainly located in the Southern outskirts, the south-Eastern and the Eastern outskirts of the Paris Basin, were chosen as an example since they are sensitive to agricultural policy changes because of:

Average farm incomes, around 146 Euros/ha in 2002, are highly dependent on cereal prices and bonuses; these represent about 346 Euros/ha, that is to say more than double the income (see table 1);

Poorly diversified cropping patterns, with cereals (55%) and oleaginous (35%) predominant; yields[1] are medium; in 2002 they stood at 73q for wheat and 33q for colza;

A compulsory wide fallow area close to 10% by lack of COPC "cereals, oleaginous and proteaginous crops";

The existence of large farms (around 154 hectares, see table 2) having on average 104 ha/worker unit (ha/WU) – this ratio varying from 50 hectares up to 170 ha/WU, with actual average fixed costs equal to 546€/ha, variable according to size strata. It is between 150 and 200 ha that the production system allows a more efficient use of equipment and workforce.

Table 2: Structural Characteristics of the reference sample (2002)

	Weighted numbers	Average areas (ha)	True fixed costs€/ha	Average farmers' age
<50ha	21	40	365	57
50 to 99	112	84	539	47
100 to 149	88	123	555	43
150 to 199	76	179	499	46
>= 200ha	101	263	576	46
Total	398	154	546	46

Because of the alignment of oleaginous premiums with cereals, Agenda 2000 has already highly affected those farms incomes. The income loss was assessed up to 150 Euros per hectare of oleaginous crops (Sourie, 2002). Moreover, due to their large size and small workforce, these farms were also very much penalized by the premium modulation implemented from 1999 to finance the environmental contracts, then abolished in 2002.

Method used: impact simulation on various measures thanks to a regional sequential model based on linear programming

This model takes into account the diversity of production systems and simulates their adaptation in terms of crop rotation and evolving structures.

According to price trend assumptions, premiums and yield progresses, the model attempts to maximize the agricultural incomes of all farms in the regions studied (398 farms) while respecting the various types of constraints which exist for these farms: constraints of area, crop mixtures, yield and idle land. From 2002 to 2012, this model shows year after year an adaptation of crop rotations and a change in the main economic results (gross margins, agricultural incomes). The model also takes into account a change, in an endogenous way, in the structures and the number of farms, and gives an assessment of scale effects. In parallel, it includes the opportunity of choosing between decline and farming.

At the end of each yearly period of income optimisation, simple rules regarding the trend of the number of farms and their structure are implemented.

[1] Standardized yields, that is to say, adjusted to seasonal variations by using yield trend estimated at 1q/ha and per year for wheat and 0.30q/ha and per year for rapeseed

A farm disappearance may occur either when the farm head retires (retirement age is fixed at 65) if the family AWU is lower than 15,000 Euros (most frequent case), or at any time if the debt rate is over 80% or if the farm income becomes negative.

In the model, the enlargement may occur only if the farm debt rate is lower than 65%; it is limited by a UAA/AWU ratio (Utilised Agricultural Area/Agricultural Work Unit) for structural control. This ratio cannot exceed 170ha/AWU and still give full AWU employment. To follow the development of the fixed costs observed in the FADN, expansion only implies a fall in the fixed labour costs per hectare[2].

The land freed up by disappearing farms is distributed between the remaining farms having the best land profitability ratings.

Hypotheses and scenarios

Lots of agricultural policy scenarios were studied in the intermediate regions (see: Wepierre, Millet, Sourie, 2001), some of them implying major redistributions of aid between farms. Only three recent scenarios will be compared: the latest European Commission proposal from January 2003 (scenario 1), the June 2003 final compromise (scenario 2) and a variation of scenario 2.

The most significant elements of these scenarios for the agricultural economy may be summed up as follows:

Scenario 1 – January 2003 proposal: total decoupling, drop in the intervention price from 101.31€/t to 95.35€/t partially compensated by a 3€/t additional aids to cereals, oleaginous and proteaginous crops, aid digression and modulation according to two brackets: 12.5% in 2012 for the €5,000-50,000 bracket per farm and 19% beyond €50,000.

Scenario 2 – June 2003 Compromise: maintenance of intervention price at 101.31€/t, withdrawal of additional aids to cereals, oleaginous and proteaginous crops (COPC), and 50% of the monthly increases, cancellation of subsidy digression and maintenance of the 5% maximum modulation rate that can be reached as early as 2007.
Variation on scenario 2 – Drop in the prices of food oleaginous and non-food oleaginous crops in order to anticipate a long-lasting deteriorated situation for the international agricultural markets.

Table 3: Key figures of the CAP scenarios

	Scenario 1 Jan. 2003 EC proposals		**Scenario 2 June 2003 Compromise**		**Variables of Scenario 2**
	2002	**2012**	**2002**	**2012**	**2012**
Wheat price (€/t)	95	81	95	87	87
Rapeseed price (€/t)			198		175
Sunflower price (€/t)			213		192
Average premium (€/ha)UAA	346	309	346	328	328
Wheat yield (t/ha)	73	84	73	84	84
Rapeseed yield (t/ha)	32	35	32	35	35

It was necessary to make a choice regarding the options left up to the States: direct aids are reckoned on strictly individual bases and the present regionalization is not called into question; no additional deduction is foreseen to put money into the flexibility fund; the observance of aid cross-compliance does not imply any fall in the farms' income; ultimately, total decoupling was chosen for scenario 2.

In 2012, the wheat price received by farm producers is based on the intervention price (table 3). The wheat price plays the role of reference price for other cereals. We assume that wheat yields increase by 1q/year and rape-seeds ones by 0.3q/year. 20% of this increase in value is absorbed by an increase in input costs. The price of food oleaginous and non-food oleaginous crops only drop in the third scenario.

[2] The FADN data show that the enlargement does not induce any drop in the mechanization fixed costs/ha.

Table 4 Impacts of a fall in oilseeds prices on rotations and incomes

	Scenario 2	Variables Scenario 2
Year	**2012**	**2012**
Percentage of cereals in rotation	52.8	56.8
Percentage of oilseeds in rotation	40.3	38.2
Income per ha (100 in 2002)	88.7	82.0
Income per farm (100 in 2002)	104.0	94.0

Results

Risk of agricultural decline (idle land)

Unlike the present direct aids, the decoupled premium does not include an obligation of production. In these conditions, a farm producer may be tempted to set aside the whole of his farm lands if in this way, the economies in the effective fixed costs is higher than the loss in gross margin, since only minimum equipment and workforce is needed to maintain the land in good conditions. Idle land could allow a 100% reduction in workforce fixed costs[3] and 45% of other costs[4]. In the simulations, idle land may happen at any age, while in reality this scenario most concerns head farmers approaching retirement.

Scenario 1 assumes an 8% rate of idle land in farms (9% of agricultural surface area). The decline remains in narrow limits. The farms liable to choose that solution are smaller and have higher fixed costs than average, 150 to 200€/ha at most. If we attempt to have no decline, the model shows that it is only necessary to recuperate 25% of the aids. The decline rate is very sensitive to the level of cereal prices; that is why decline does not occur any more in scenario 2.

Anticipating the development of agricultural incomes

It is difficult to foresee what the agricultural market tendency will be by 2012. Therefore, we voluntarily chose rather low price scenarios, in order to attempt to assess farmers' risk levels (the reader can then make his own judgement on these assumptions). These scenarios are far from being the most optimistic hypotheses used by the Commission in its prospective studies (Prospects for Agriculture Markets 2002-2009, June 2002).

Graph 1 (see graphs at the end of the document) shows the income development per farm; they are in constant Euros (1.4%/year inflation rate).

Income deductions from scenario 1 were much higher than increases in income per hectare but also per farm, despite the scale effects following expansion. Therefore, the income goes from index 100 in 2002 to index 88.7 in 2012 (graph 2).

With scenario 2, the agricultural income per farm should remain steady, even increase (+4%, graph 2); However, incomes per hectare may deteriorate, going from index 100 to index 91.2 (graph 1). Under this trend, effective fixed costs per hectare drop very little from 540€/ha to 527€/ha (adjusted for inflation) because of the hypothesis made on the best efficiency of the permanent workforce. So this is an understandable trend; but the farms which are unable to grow or diversify into other activities may suffer from a significant erosion of their income.

[3] In the 2001 FADN sample of cereal farms, these costs, on average, represent 27% of the real fixed costs.
[4] These estimates are based on the detailed fixed costs provided by FADN. But they suppose that the agricultural equipment is sold at its residual accounting value.

Structural developments

Both scenarios follow almost the same structural developments[5]. This rigidity comes from the fact that farm disappearance is laregly due to farmers' retirement and is highly dependent on the age pyramid. Furthermore, small farms will also be concerned by disappearances (a consequence of the application of the €15,000 ratio to family agricultural workforce units (AWU) which are limited in number. Finally, the number of farms decreases by 12% (that is to say -1.3% per year, graph 3) and the area increases by 1.4% per year (that is to say +22ha, graph 4). Indeed, the disappearance rate of big farm businesses observed in the past is higher (-20% for 1990-1999, Blogowski, Pingault, 2002), but during that time, there were many early retirements. The simulation results show a drop in the farm disappearance rate.

Development of crop rotation and techniques

Despite the flexibility introduced into rotations by "wheat on wheat"[6] cropping, decoupling hardly modifies the balance between cereals and oleaginous (graph 5), a result which is hardly surprising since the coupled premiums for cereals and oleaginous are identical.

The wheat-on-wheat cropping areas account for no more than 10% of the wheat rotation areas. On the other hand, thanks to its high price durum wheat maintains its surface area when additional premiums disappear.

Rapeseed for energy purposes is a major crop in these regions because it allows a reduction in set-aside lands. With a carbon premium of 45€/ha, the reform slightly stimulates rapeseed production "outside mandatory set aside". Unnecessary for the moment, this incentive could have an interest if the energetic crop supply increased beyond the production potentialities of set-aside lands or if set-aside areas decreased[7].

The reform should have little impact on the intensification level of the land, as A.S. Wepierre's report (2001) showed it, what is true to the producer microeconomic theory which is the theoretical basis of the optimisation model used[8].

Effects of a drop in prices of food and non-food oleaginous crops (variation of scenario 2)

Oilseeds, mainly rapeseed, are major crops in these regions. If market perspectives are worse than the European Commission predictions, the model shows the following effects on the cereals and oleaginous supply and agricultural incomes:

Incomes fall in a significant way, income per farm included (see table 4). The balance between cereals and rotation heads is slightly modified in favour of cereals (+4 points), but we see no "explosion" of cereal areas, though technically possible with the potential for wheat mono-cropping.

Conclusions

The Luxembourg compromise (scenario 2) mitigated the effect of those measures which would have been most harmful for cereal-farm incomes in the intermediate regions, namely the drop in intervention price and premiums. In scenario 2, the farms' average agricultural income (in constant Euros) should be stable by 2012 thanks to expansion, provided that cross-compliance measures do not affect this income and that rapeseed prices remain at a good level (around 200€/t). While recoupling was necessary in order to avoid decline, even a slight decline, it appears much less justified with the Luxembourg compromise (scenario 2).

[5] There should be major cuts on very high incomes to increase the disappearance of farms of more than 100 hectares; this was shown by simulations supposing a more egalitarian distribution of aids per farm (see Welpierre, Millet, Sourie, 2001).
[6] 40% maximum wheat of wheat compared with wheat rotation, but wheat-on-wheat induces a 5q fall in yield and a 50€/ha increases in costs
[7] We mention a 5% rate for 2004 because of the low level of cereal stocks, that is to say 600.000 ha of set-aside used by non-food crops; the present area in non-food crops is around 400.000 hectares.
[8] The premium is an economical magnitude which remains constant per hectare, whatever the input level. It does not enter in the search for economic optimum

If we now anticipate much less favourable oleaginous market conditions than those retained in scenario 2 (175€/t for rapeseed), farm incomes in the intermediate regions clearly deteriorate since agricultural incomes per farm drop.

It looks like this reform should not accelerate farm disappearances. Conversely, simulation results show a slowing down of this trend.

Farm disappearance is indeed a variable of adjustment, but its effects are limited by the inertia coming from the farmers' age pyramid. Therefore, in such conditions, farmers must consider cutting mechanization costs in order to face difficult circumstances on the agricultural produce markets (variable of scenario 2). This variable of adjustment has not yet been integrated into the simulations.

The 2003 reform does not really "help energetic production along", although the European Commission still held onto very ambitious objectives for 2010.

Finally, decoupling should not favour farm expansion, which seems to be the conclusion of the reformers who introduced the subsidy cross-compliance policy.

Those results, obtained with a simulation model which integrates changes in agricultural structures, are a resource for reflection and in no way a forecast. They attempt to show what could happen if the cereal agriculture of the intermediate regions was faced with depressed prices internationally. Astute readers will also have noted that diversification opportunities and rotation diversification, which will be made easier by the decoupling, or diversification towards other non-farming activities, have not been studied.

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For further information

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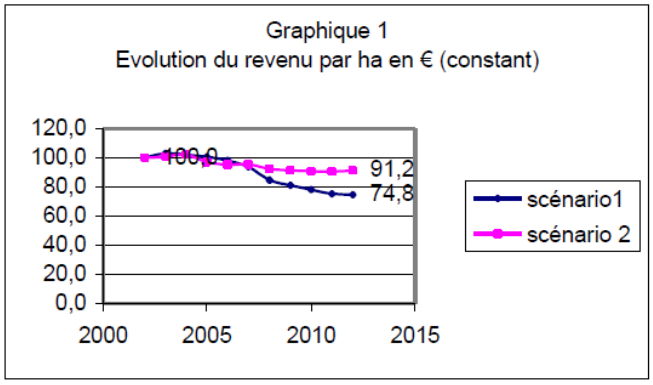
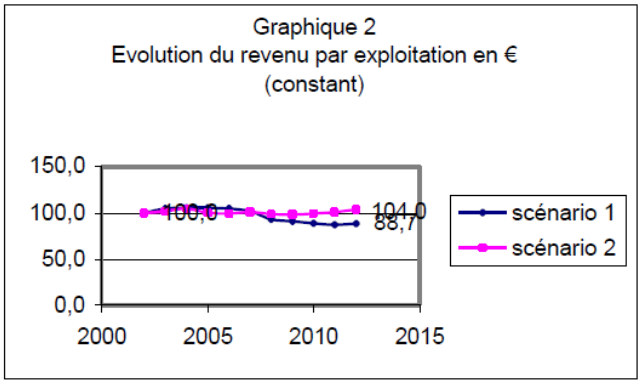
GRAPHS 1 to 5

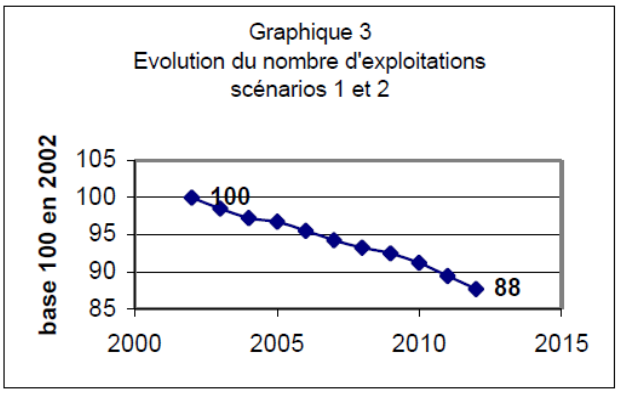
Graph 1: Evolution of income per ha in constant euro



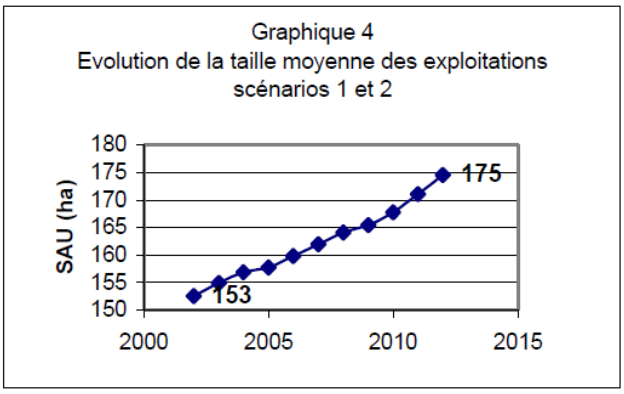
Graph 2: Evolution of income by farm in constant euro



Graph 3: Evolution of farm number (scenarios 1 & 2)



Graph 4: Evolution of the average farm size in ha (scenarios 1 & 2)



Graph 5: Evolution of cereals (in blue) and oilseeds (in pink) shares in cropping patterns (scenario 2)