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2003 CAP reform: Impacts of various options on supply in French regions

Generally speaking, total aid decoupling, one of the possible options of the 2003 reform, leads to a decline in arable crops and an extensification in beef production; this extensification avoids rural decline. However, developments differ according to regions. Arable crops remain more stable in the already specialised regions and instead drop in the least favoured areas, particularly in mountains. Total decoupling is mainly unfavourable to suckler livestock in French central regions where there are at the same time extensification (when livestock is already extensive) and livestock reduction. BSP partial decoupling is not sufficient to reverse these trends, conversely to Suckler Cow Premium (SCP) recoupling. In more intensive regions, for example in the West, adaptation possibilities appear to be bigger, even in the case of total decoupling: beef cattle do not decline with the extensification which is conducted to the detriment of arable crops. So partial recoupling may lead to an increase in beef cattle. If the objective of the public authority is to maintain equilibrium in beef cattle distribution, keeping the coupled premium for suckler-cows may be justified.

Regional effects are one of the questions raised by the implementation of the new CAP reform (2003). As decoupling gives a more driving role to the market, a transfer of productions may be expected, and so in some regions they may be relocated or even abandoned. The possibility given to States of opting for partial aid decoupling is justified by the willingness to maintain production in some areas, particularly in the least favoured or intermediate areas.

The study of regional effects requires appropriate tools such as the positive mathematical

programming used here (see insert). It is centred on an analysis of supply in various French regions for the main products pertaining to the MCO concerned by the reform. One of the main limits of the analysis is that it regards regional prices as exogenous, unlike other macro-economic models such as the MEGAAF model for the whole of France (see Gohin, in this file) where prices are endogenous. The division used in the simulations is based on 25 regions, plain and mountain areas being separated into Midi-Pyrénées, Rhone-Alpes and Auvergne.

Frame: regional modelling by positive mathematical programming (PMP)

Supply is modelled at regional level by PMP. This approach is based on the observation of supply during a base year considered as optimal because of the current price system and the political agricultural measures and an assumption of growth in variable costs according to the area engaged in each activity. The regional models built are surface area allocation models, with gross margin being the maximizing criterion. These margins are calculated for each region from the 1997 FADN data (base year of the model), by estimating the variable costs per hectare and stocking on each fodder type. The technical progress coefficients used are national and are obtained from macro-economic data.

The modelling used enables variable costs, yields and stocking to be adapted to price variations and to subsidies per head for livestock. This adaptation is done in two steps: a) an activity adjustment by activity based on yield or stocking functions of the Cobb-Douglas type; b) a homothetic transformation of cost functions in PMP models.

Three scenarios are examined to the horizon of 2008:

Total decoupling: complete aid decoupling, within the meaning of the 2003 reform.

“SCP” Partial decoupling: 75% decoupling of arable crops, maintenance of SCP coupled at 100% and maintenance of compensatory ovine premium (COP) coupled at 50%.

“BSP” Partial decoupling: 75% decoupling of arable crops, maintenance of BSP coupled at 100% and maintenance of COP coupled at 50%.

The results of these scenarios are expressed in relation to a baseline scenario in which all the 2003 reform aids would in 2008 have kept all the forms of attribution of Agenda 2000, that is, mainly coupled to the area for arable crops and cattle head for beef. Moreover, the study is based on the French Farm Accounting Data Network (FADN) data. First, we shall briefly analyse the developments projected in 2008 at national level through the model in the central scenario. Then, still at national level, we shall study the results of the three scenarios before with addressing the regional effects.

From 1997 to 2008 according to central scenario: more cereals, less oilseeds and significant decline in beef production

One of the main measures of Agenda 2000 was to introduce a partial decoupling in arable crops, by aligning the premium amount per hectare of oilseeds with the amount of cereal premiums. The expected and observed effects are a decline in oilseeds to the benefit of cereals: in our model (see table 1), oilseeds decline by 30% in cultivated surface area and 19% in production, compared with 1997. From 1997 until 2003 the fall observed in oilseeds surface area is but 10%. In the model results, the sharper fall in these areas is due to two elements:

- Over a longer timeframe, productivity gains are higher for cereals than for oilseeds, which should lead, in Agenda 2000, to a constant erosion of oilseeds, at least from the point of view of unchanged prices.

- The model does not take into account non-food fallow and sustainable farming contracts created to favour multiple crop rotations and *de facto* to slow down the decline in oilseeds.

Table 1: Simulated impacts of the baseline scenario: projection of the 2003 reform by 2008 with the Agenda 2000 support mode

National results as a % compared with 1997

	Central scenario
	% compared with 1997
Cereals: areas	7.5
production	16.6
Oilseeds: areas	-30.1
production	-18.7
Main fodder areas (MFA)	-1.6
Beef cattle*	0.8
Beef production**	-6.3
Ewes	1.4
	Share in UAA
Voluntary set-aside land	0.0
	Livestock units/ha MFA
Beef stocking	1.33

(*) young bulls and milk calves included

(**) dairy cull cows included

A major component of the projected evolutions is the maintenance of productivity gains in the milk sector by increasing the milk yield. The price falls in dairy produce adopted by the reform and their partial compensation by direct aid are not enough for quotas to be unused. The maintenance of milk production coupled with an increase in the yield per cow leads to a reduction in milk cattle and so frees up some areas. This withdrawal of fodder areas is of no benefit to suckler cattle which remain almost stable, given the programmed fall in prices of -20% only partly compensated by the increase in premiums per head and supply checking measures. Beef production also falls slightly (-6%) given the reduction in milk cattle.

It is in cereal production that the margins/hectare improve best despite the Agenda 2000 falls in prices (-15%), only partly compensated by an increase in aid/area. This margin improvement is due to productivity gains and generates an 8% increase in cereal area and a 17% in production. The 9% increase in yield is the result of the positive effects of productivity gains and negative effects induced by the fall in prices.

Effects of total decoupling of aid within the meaning of the 2003 reform: between rural abandonment and production extensification

One of the options of the 2003 CAP reform is the total aid decoupling in the CMO of arable crops, beef, mutton and milk, that is to say the conversion of aid into a global amount per farm, set on a historical basis: in Agenda 2000, this aid depended on arable crop areas, cattle heads in beef and mutton or on milk quotas.

This decoupling has several effects that can be analytically broken down to provide an understanding of the model results:

- In the arable crop sector, taken separately, decoupling the new single farm premium has no effect, at least in the short term since the new single farm premium is not fundamentally different for each farm, from a single premium per hectare established in Agenda 2000.
- In the milk sector, taken separately, the effect is null as long as quotas remain fulfilled, which is the case in the situation studied. However, a production extensification induced by the withdrawal of the specific premium for maize fodder can be observed.
- The decoupling effect is mainly observed in the allocation of areas between arable crops, fodder for beef and mutton or set-aside land.

First, we assume that the stocking-rate per fodder type remains unchanged, which is a rather short-term vision. A certain extensification of beef production, however, appears because of the withdrawal of the specific premium for maize fodder. As a whole, the payments per hectare outlined in Agenda 2000 are higher in arable crops than in fodder for meat. Thus, excluding subsidies, margins fall more in arable crops with decoupling than they do in the meat sector. Areas in arable crops decline by 2.3% for cereals (see table 2). Excluding subsidies, margins become negative on marginal soils: a phenomenon of rural abandonment then appears that concerns 2.4% of the area. Fodder areas also fall and sheep, the payments (+11.3%) of which were initially lower, develop to the detriment of beef cattle (-9.5%).

In the medium term, production systems, particularly livestock, are much less rigid and the withdrawal of the specific premium per head modifies the “optimum” stocking-rate on beef cattle (which falls from 1.31% per hectare of Main fodder Area (MFA) to 1.09 according to our modelling) and therefore encourages meat producers to extensify. Meadows progress to the detriment of arable crops (-5% for cereals) and the drop in beef cattle is slightly lower than without adaptation. Extensification replaces rural abandonment.

Table 2: Simulated impacts of the 2003 reform

National results aggregated as a % compared with baseline scenario - (Distinction between short and medium term)

Decoupling	Total	SCP(a)	BSP(b)	Total	SCP(a)	BSP(b)
	Short term vision Without adaptation (c)			Medium term vision With adaptation (d)		
% compared with baseline						
Cereals: areas	-2.3	-0.6	0.8	-5.4	-2.0	-1.8
Oilseeds: areas	-1.3	-0.6	0.8	-2.6	-0.8	-0.2
Main fodder areas (MFA)	-2.0	-0.6	-1.8	7.7	4.1	4.1
Beef cattle	9.5	-5.7	-6.9	-8.5	-3.2	-6.9
Beef production	-6.6	-4.1	-4.9	-6.1	-2.3	-5
Ewes	11.3	7.2	11.0	-1.1	2.1	0.3
(Share in UAA)						
Voluntary set-aside land	2.4	1.0	0.9	0.1	0.1	0.0
Beef stocking	1.31	1.30	1.33	1.09	1.23	1.18

- (a) Partial decoupling with SCP
- (b) Partial decoupling with 75% of BSP
- (c) With unchanged technology
- (d) Yields, stocking and variable stocking-rates adapting to price variations

Partial decoupling: necessarily intermediate results between absence of decoupling and decoupling

Partial decoupling necessarily leads to intermediate scenarios between central and decoupling scenarios. When 25% of the arable crop payments remain coupled to the hectare (that is to say in both partial decoupling scenarios), cereal areas only drop by 2% (instead of 5%, in the decoupling scenario) with a lesser progression of MFA. But keeping SCP premiums per head at 100% or keeping BSP premiums per head at 75% slows down the extensification which would be induced by decoupling, and beef cattle declines less, chiefly in the SCP recoupling scenario (-3.2%).

Relative specialisation of regions under decoupling effect

The impact of aid decoupling on area allocation and supply is fairly different across regions (see table 4). These differences can be explained by the position of the various activities practised and the adaptation potentialities in each region.

Cereals decline little and even progress in the regions where arable crops are already dominant or associated with intensive milk production (Ile de France, Picardie, Nord-Pas-de-Calais, Aquitaine or even Alsace). There, yields are high, which makes the development of other productions unattractive. On the other hand, the cereal decline can be observed in two cases:

- In little performing regions where yields are low, chiefly in the regions of high and medium mountains (Midi-Pyrénées, Limousin, Auvergne and South-East regions).
- In regions where beef production is quite intensive and where extensification is to the detriment of the cereal area. This is the case of the Pays-de-la-Loire, for instance (as stated in this file by Michel Lherm *et alii*).

Beef production is extensifying in all regions, (suckler cows and bull calves), but the effect of this extensification on production¹ differs according to system characteristics:

- In extensive regions, like the suckler areas of the Centre and where a great proportion of the producers are calf producers, the initial stocking is already low and the potential for progression of the fodder areas is limited. Decoupling increases this extensification, but this is interpreted as a sharp decline in suckler cattle (Bourgogne, Auvergne).
- In more intensive regions where meat production is carried out by suckling producer-finishers or suckling bull calf fatteners, extensification, which as we have seen comes to the detriment of arable crops, helps maintain beef cattle (Pays-de-la-Loire and to a lesser extent, Brittany). This is also the case in some of the regions where arable crops and meat production initially co-existed (Centre and Champagne-Ardenne).

It can be noted that except for a decline in cereals, decoupling has little effect on mountainous regions where milk is dominant (Rhône-Alpes and to a lesser extent, Midi-Pyrénées).

Bovine breeding regions are very sensitive to recoupling options

If the maintenance of the 25% option of direct aids to arable crops was simulated with one of the options of beef partial coupling and the option of 50% coupling of ewes, the decline in cereal areas would be attenuated, particularly in the non-specialised or least-performing regions. The measure has practically no effect in the regions of arable crops such as Ile de France, Nord or Picardy.

As far as beef is concerned and as expected, the simulated options have contrasting effects in the regions according to livestock type. SCP coupling favours production maintenance but more particularly in the regions of extensive suckling-stocking (Burgundy, Auvergne, Limousin, Aquitaine, Centre and Poitou-Charentes). Compared with total decoupling, these regions are insensitive to the maintenance of the 75% BSP. This is not sufficient to maintain the level of suckling cattle in these regions.

On the other hand, the maintenance of the 75% BSP reinforces the fattener-finisher specialisation in the intensive regions (Brittany, Pays-de-la-Loire). Unlike total decoupling, there would be stocking levels which would remain quite high and even beef cattle increases compared with the central scenario.

A few conclusions

In terms of regional differentiation, the decoupling of aid such as proposed in one of the 2003 reform options has two main effects which are interdependent:

- An increase in the relative specialisation of the regions, particularly in arable crops which are maintained better in the already specialised areas and which highly decline in intermediate and mountainous areas.
- A production extensification in beef systems which is marked by a much bigger decline in cattle in the suckler-cattle areas of the centre of France than in the intensive western regions.

If two of the reform objectives are to favour less intensive agriculture on the one hand and to slow down production growth to help the European

¹ Table 4 which gives variations of production or cattle in percentage is sometimes misleading insofar as it is calculated from low initial values. It must be read jointly with table 3 which gives absolute values

Union keep its commitments at international level on the other hand, total aid-decoupling seems to be coherent. As stated by Gohin in this paper, it notably reverses the trend observed since the 1970s of taking out meadows to the profit of tilled lands. Our results do not predict abandonment but the risk may be under-estimated in our model, given the farmers' expectations on their references: the voluntary set-aside land which had been possible since 1992 has not been put into practice and this may be because of the farmers' fear that they are losing a share of their references in the later CAP reforms. A definitive establishment of the rights to subsidies on a historical basis may encourage abandonment. But our model, as others, can only rely on past observations.

Of course, partial aid recoupling mitigates both effects mentioned. Compared with total decoupling, BSP partial recoupling does not enable production to be better maintained in the

suckler-livestock areas of the French Centre and encourages growth in intensive livestock, in particular in the Western regions. This is not the case with the SCP recoupling. If public authorities' objective is to keep some equilibrium in the geographical distribution of beef cattle, the maintenance of coupled premiums for suckler cows can be justified. In the end, market logic with total aid decoupling could lead to developments for beef production comparable to pork production, only mitigated. As in the American model, some of the regions could be specialised in producing (French Centre) and some others in fattening (French West). With the problems caused to the environment by concentrated production, as with pork production

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Barkaoui A. et Butault J.-P. (2000) *Effets de scénarios alternatifs de politique agricole commune sur le secteur des grandes cultures dans les régions européennes*. Rapport pour le Ministère de l'Agriculture et de la Pêche, Nancy, INRA-ESR, 150p.

Table 3: simulated impacts of 2003 reform by 2008 with yield and stocking rate adaptation
Regional results in level of the baseline scenario and total decoupling scenario

Regions	Basic scenario				Total decoupling scenario			
	Cereals	MFA	Beef cattle	Stocking	Cereals	MFA	Beef cattle	Stocking
	'000 ha	'000 ha	'000	LU/ha	'000 ha	'000 ha	'000	LU/ha
Ile-de-France	323	7	4	1.33	323	8	3	-
Champagne-Ardenne	697	348	189	1.26	666	391	192	1.04
Picardie	628	171	138	2.36	636	165	90	1.69
Haute-Normandie	310	246	176	1.91	302	245	151	1.60
Centre	1334	321	268	1.15	1309	360	262	0.90
Basse-Normandie	291	719	311	1.39	282	735	261	1.09
Bourgogne	679	786	793	1.16	654	816	680	0.96
Nord-Pas-de-Calais	357	208	151	2.21	374	194	106	1.84
Lorraine	419	510	321	1.46	405	525	255	1.10
Alsace	174	66	35	1.62	184	56	19	1.54
Franche-Comté	175	410	121	1.07	159	415	100	0.84
Pays-de-la-Loire	670	1047	870	1.68	543	1198	882	1.35
Bretagne	639	752	318	2.52	595	809	341	2.18
Poitou-Charentes	717	482	290	1.38	657	560	273	1.14
Aquitaine	516	397	345	1.36	514	407	294	1.14
Midi-Pyrénées (plaine)	615	650	449	1.19	586	819	416	0.96
Midi-Pyrénées (montagne)	49	270	169	1.18	30	290	157	0.99
Limousin	95	703	628	1.09	20	778	616	0.92
Rhône-Alpes (plaine)	340	391	167	1.24	333	404	161	1.01
Rhône-Alpes (montagne)	43	249	49	0.93	33	265	48	0.79
Auvergne plaine)	85	160	148	1.14	79	168	126	0.94
Auvergne (montagne)	213	904	522	1.03	185	938	477	0.88
Languedoc-Roussillon	93	86	79	2.07	87	92	76	1.81
PACA	77	58	10	1.69	71	67	9	1.55
Corse	0	44	34	1.40	0	44	30	1.34
France	9539	9985	6585	1.33	9027	10749	6025	1.09

Table 4: Simulated impacts of the 2003 reform by 2008 with yield and stocking rate adaptation
Regional results as a % compared with the baseline

Regions	Cereals			MFA			Beef cattle			Stocking (LU/ha)		
	Total	SCP	BSP	Total	SCP	BSP	Total	SCP	BSP	Total	SCP	BSP
Ile-de-France	0	0	1	-	-	-	-	-	-	-	-	-
Champagne-Ardenne	-4	0	-3	12	3	8	1	-10	3	1.04	1.12	1.15
Picardie	1	2	2	-3	-8	-6	-34	-31	-22	1.69	2.02	2.11
Haute-Normandie	-3	2	1	0	-3	-1	-14	-16	-4	1.60	1.70	1.83
Centre	-2	-2	3	12	11	-12	-3	13	-24	0.90	1.06	0.96
Basse-Normandie	-3	3	-2	2	-1	1	-16	-19	-1	1.09	1.17	1.31
Bourgogne	-4	-8	4	4	8	-3	-14	1	-17	0.96	1.08	1.01
Nord-Pas-de-Calais	5	8	5	-7	-14	-8	-30	-37	-17	1.84	2.12	2.14
Lorraine	-3	3	-1	3	-3	1	-20	-25	-13	1.10	1.20	1.27
Alsace	6	11	5	-	-	-	-	-	-	1.54	2.86	1.67
Franche-Comté	-9	-3	-3	1	-2	1	-17	-19	-7	0.84	0.91	0.94
Pays-de-la-Loire	-19	-7	-16	14	6	12	1	1	8	1.35	1.57	1.48
Bretagne	-7	-3	-6	8	4	6	7	-1	14	2.18	2.37	2.38
Poitou-Charentes	-8	-7	-4	16	13	9	-6	12	-7	1.14	1.34	1.22
Aquitaine	0	-4	3	2	7	-2	-15	13	-20	1.14	1.40	1.16
Midi-Pyrénées (plaine)	-5	2	-1	26	19	21	-7	0	-10	0.96	1.14	0.98
Midi-Pyrénées (montagne)	-40	-23	-23	7	4	4	-7	0	-8	0.99	1.13	1.03
Limousin	-79	-49	-60	11	7	8	-2	0	-5	0.92	1.04	0.95
Rhône-Alpes (plaine)	-2	5	1	3	-3	1	-4	-8	-3	1.01	1.15	1.09
Rhône-Alpes (montagne)	-22	-9	-14	6	4	5	0	-2	1	0.79	0.89	0.82
Auvergne plaine)	-7	-8	-4	5	5	3	-15	-4	-12	0.94	1.06	1.00
Auvergne (montagne)	-14	-6	-6	4	2	2	-9	0	-8	0.88	1.01	0.93
Languedoc-Roussillon	-7	-5	-5	7	5	5	-4	6	-2	1.81	2.04	1.91
PACA	-8	-10	-10	16	20	20	-4	-2	-9	1.55	1.74	1.63
Corse	-	-	-	0	0	0	-13	-3	-12	1.34	1.43	1.45
France	-5.4	-2.0	-1.8	7.7	4.1	4.1	-8.5	-3.2	-6.9	1.09	1.23	1.18