



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# THE ABROGATION OF SET ASIDE AND THE INCREASE OF CEREAL PRICES: CAN THEY REVERT THE DECLINE OF CEREAL PRODUCTION GENERATED BY DECOUPLING?

**Simone Severini and Stefano Valle**

**University of Tuscia, Viterbo Italy (Dep. DEAR)**

**Contact: severini@unitus.it**



European Association of  
Agricultural Economists



Università  
degli Studi della Tuscia



Istituto nazionale  
di Economia Agraria



Rete di informazione  
della Commissione Europea

Paper prepared for the 109<sup>th</sup> EAAE Seminar " THE CAP AFTER THE FISCHLER REFORM: NATIONAL IMPLEMENTATIONS, IMPACT ASSESSMENT AND THE AGENDA FOR FUTURE REFORMS".

Viterbo, Italy, November 20-21<sup>st</sup>, 2008.

*Copyright 2008 by Simone Severini and Stefano Valle. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

## **Abstract**

The decoupling of direct payments, caused by the introduction of the Single Payment Scheme (SPS), has generated an incentive for farmers to decrease the production of cereals, oilseeds and protein crops (COP) and (because of the reform of sugar CMO) sugar beet. In some cases, this has also provided a strong enough incentive for farmers to let some of the available land uncultivated in the years immediately following the introduction of the SPS.

However, in the last few years, cereal prices have sharply increased under the pressure of a growing world demand. Under this situation, the EU Commission has abrogated the set aside requirement allowing the cultivation on idle land. In this way the Commission intends to allow EU farmers to take advantage of the new market conditions and to stabilise cereal market.

This paper aims at assessing how much the abrogation of set aside requirement can be effective in increasing cereal production. This is not a trivial question given that in some farms the introduction of SPS has also resulted in some of the land previously cultivated (i.e. not set aside) to be left uncultivated. Under this circumstance, the set aside constraint could be not binding and, therefore, its abrogation may not result in an increase of production. The second aim of the paper is to evaluate to what extent increases of cereal prices could foster cereal production and reduce the amount of uncultivated land.

The analysis has been carried out on a sample of FADN farms of three study areas located in two regions of Italy (Emilia Romagna and Veneto) using Positive Mathematical Programming (PMP) models.

The analysis has shown that the decoupling of direct payments generates a not negligible decrease of COP production and pushes some farmers to let a limited amount of land uncultivated. Therefore, the abrogation of set aside requirement per-se increases cereal production, but this increase is not in all cases very relevant. The increases of cereal prices could be more effective than the abrogation of set aside requirement in increasing cereal production. The combination of both considered factors is expected to revert the decline of cereal production experienced in the considered farms after the introduction of the SPS even if the magnitude of this effect is strongly affected by the level of cereal prices.

**Keywords:** CAP, Decoupling, Set Aside, Cereal Prices, PMP, Farmers behaviour.

**JEL Classification:** Q10, Q18.

## **Introduction**

The decoupling of direct payments, caused by the introduction of the Single Payment Scheme (SPS), has generated an incentive for farmers to decrease the production of cereals, oilseeds and protein crops (COP) and (because of the reform of sugar CMO and fruit and vegetable CMO) sugar beet and vegetables. In some cases, this has also provided a strong enough incentive for farmers to let some of the available land uncultivated in the years immediately following the introduction of the SPS.

However, in the last few years, cereal prices have sharply increased under the pressure of a growing world demand. Under this situation, the EU Commission has abrogated the set aside requirement allowing the cultivation on idle land. In this way the Commission intends to allow EU farmers to take advantage of the new market conditions and to stabilise cereal market.

This paper aims first at assessing how much the abrogation of set aside requirement can be effective in increasing cereal production. This is not a trivial question given that in some farms the introduction of SPS has also resulted in some of the land previously cultivated (i.e. not set aside) to be left uncultivated. Under this circumstance, the set aside constraint could be not binding and, therefore, its abrogation may not result in an increase of production. The second aim of the paper is to evaluate to what extent increases of cereal prices could foster cereal production and reduce the amount of uncultivated land. The third objective is to analyse how the impact of the abrogation of set aside requirement could differ under different cereal price levels.

The analysis has been carried out on a sample FADN farms located in two regions of Italy (Emilia Romagna and Veneto) by means of Positive Mathematical Programming (PMP) models. The sample has been stratified to take into account of likely different behaviour of farmers running small, medium and large farms. The performed simulations refer to: the introduction of SPS and reforms of other CMOs; the abrogation of set aside requirement; increases of cereal prices without and with the abrogation of set aside requirement.

Next paragraph recalls the evolution of cereal prices in the recent past; paragraph 3 provides information on the programming models, the selected farm samples, and the simulation scenarios. Paragraph 4 describes simulation results while the last paragraph draws some final conclusions on these results.

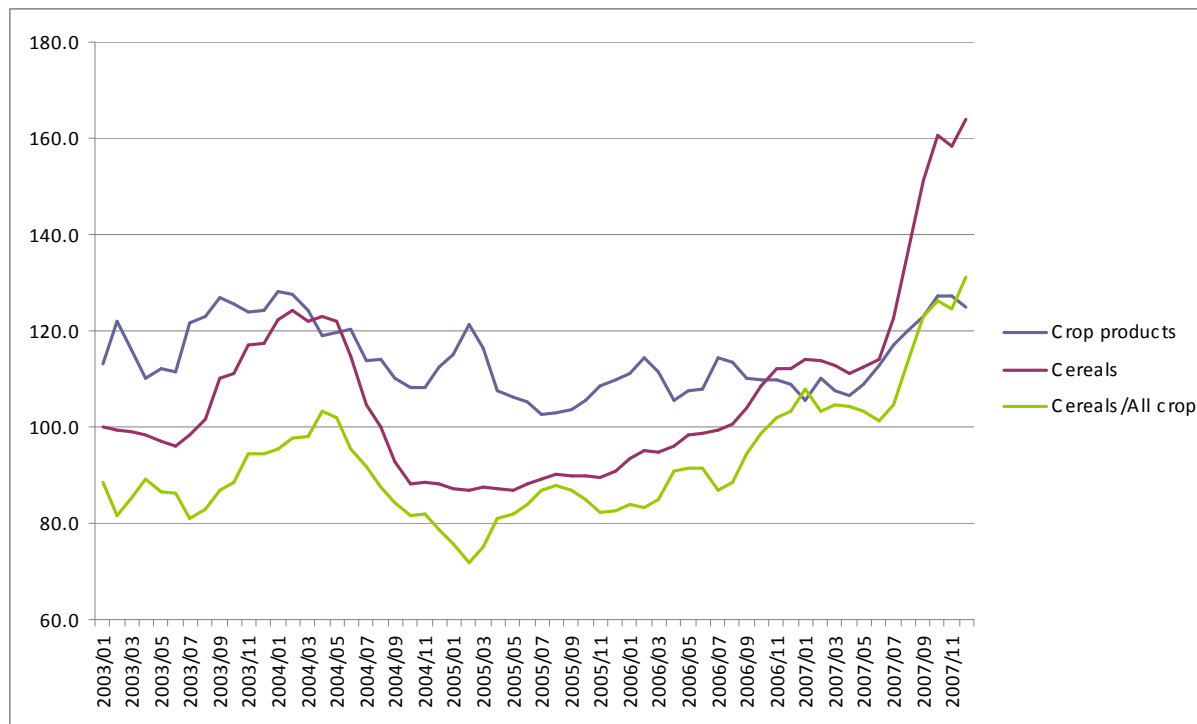
## **Background**

In November 2007 the European Commission has adopted the document “Health Check of the CAP Reform”. The aim is to complete the decoupling of direct payments and to reinforce modulation, to simplify the SPS by introducing the regionalization and the minimum requirements for the access to direct payments. The proposal for abrogation of the set aside requirement as well as of cereal intervention fits in this framework.

The rationale for the set aside abrogation derives from the increasing demand of cereals (for food, animal feeding and biofuels) that has taken place in the last years (Tangermann, 2008).

The evolution of world market for cereals has had an impact on cereal prices in Italy, too. Figure 1 depicts the evolution of price indexes for all crop products and for cereal in the recent years (ISTAT).

**Figure 1 - Evolution of price indexes for cereals and all crops products in Italy (2003-2007)**



Source: elaboration on ISTAT data.

This shows that the level of cereal prices, in comparison with the price index for all crop products, has been relatively stable up to the end of 2006 but has raised steadily in 2007. This evolution has surely increased the relative profitability to grow cereals in the Italian farm sector: the evolution of the ratio between the price indexes for cereal and for all crop products provides a mean to measure how strong this phenomenon has been. Between 2003 and 2007 (yearly averages) this ratio has increased by 29.7%. However, the data shows that the increase of cereal prices has been even stronger in the last half of the 2007: in facts, from 2003 to the second half of 2007 the price index ratio has increased by 47.7%.

There is no consensus on at what level cereal prices will stay in the future. Therefore, the simulations performed by means of the farm PMP models consider the hypothesis of relative increases of cereal prices of 30 and 50% from baseline levels i.e. similar in magnitude to the ones observed in the recent past.

## Material and methods.

The analysis is conducted by means of farm Positive Mathematical Programming (PMP) models.

The PMP has been developed in the 90's (Paris, 1993; Howitt, 1995; Arfini and Paris, 1995; Paris and Howitt, 1998) and it has been largely utilized for agricultural policy analysis in Europe (Heckelei *et al.*, 1997, 2000; Paris *et al.*, 2000; Arfini *et al.*, 2003; Buysse *et al.*, 2005a, 2005b).

Despite this large utilization of PMP models, it is important to highlight some limits of this methodology in order to consider correctly the obtained results. These models refer to short-term conditions, thus they give quite conservative results especially in case of large changes of the market or policy framework. Another limit is that these models represent only the evolution of the supply structure. For this reason it is necessary to assume exogenous price conditions. Furthermore, it is not possible to include activities which are not part of the baseline situation in these models even if the Paris and Arfini approach has permitted to increase the choice set within a homogenous group of farms. In the empirical analysis presented here, the introduction of the SPS represents a relevant change, therefore it is likely that the utilised approach underestimates the size of the real adjustment shown by the farms in the post-reform periods<sup>1</sup>.

These models have been developed by using the approach proposed by Paris and Arfini (2000) and also used by Severini and Valle (2007). Therefore, the programming models used for the simulations include in their objective functions quadratic cost functions recovered by using the Maximum Entropy approach (Golan *et al.*, 1996; Paris *et al.*, 1998). This methodology derives from the theories of mathematical programming duality and production cost.

Differently from the Paris and Arfini approach, in this model the set aside constraint is also considered in the first step of PMP. The measures foreseen by SPS and sugar and fruit and vegetable CMO reforms have been introduced in the models realised on the basis of the pre-reform data (2003). Afterwards, the simulation scenarios considering the set aside abrogation and the increase of cereal prices have been analysed using this last version of the model.

For each representative macro-farm (sum of a group of homogenous farms), the model has the following quadratic objective function<sup>2</sup>:

$$(1) \quad \max_{\mathbf{x} \geq 0, \mathbf{h} \geq 0} \boldsymbol{\pi} = (\mathbf{p}' \mathbf{x} + \mathbf{s}' \mathbf{h} + \text{uev h sp} - \frac{1}{2} \mathbf{x}' \mathbf{Q} \mathbf{x} - \text{cgaec h gaec} - \text{mod})$$

---

<sup>1</sup> The analysis has been carried out when there were still not available farm data referring to the years after the introduction of SPS.

<sup>2</sup> Symbols in **bold** refer to vectors or matrixes; other symbols refer to scalars.

where:

$\pi$	farm gross margin (€);
$\mathbf{p}$	vector of average prices of the $j$ activities <sup>3</sup> ( $j \times 1$ dimension) (€/t);
$\mathbf{x}$	vector of the productions ( $j \times 1$ ) (t);
$\mathbf{s}$	vector of the aids coupled with land use ( $j \times 1$ ) (€/ha);
$\mathbf{h}$	vector of lands cultivated with different crops ( $j \times 1$ ) (ha);
uev	unitary entitlement value (€/ha);
hsp	land considered for the single payment (ha);
$\mathbf{Q}$	matrix of the quadratic cost function coefficients ( $j \times j$ ) (€, €/t, € <sup>2</sup> );
cgaec	unitary cost for good agricultural and environmental practices (€/ha);
hgaec	uncultivated land following good agricultural and environmental practices (ha);
mod	modulated aids (€).

Function (1) is subject to the following constraints:

- (2)  $\mathbf{A} \cdot \mathbf{x} + hsa \leq LAND$  land availability
- (3)  $\mathbf{D} \cdot \mathbf{x} = \mathbf{h}$  balance between productions and cultivated areas
- (4)  $hsa \geq \overline{hsa}$  set-aside
- (5)  $hsp \leq \mathbf{Heleg} \cdot \mathbf{h}$  availability of eligible land
- (6)  $hsp \leq EntAv$  entitlement availability
- (7)  $aid \leq aid1 + aid2$  aids within and over modulation threshold
- (8)  $aid1 \leq tresh$  modulation threshold
- (9)  $mod \geq aid2 \cdot modr$  definition of modulated aids
- (10)  $x_{beet} \cdot YSUG \leq Q_{SUG}$  sugar quota

where:

$\mathbf{A}$	vector of crop yields inverse ( $j \times 1$ ) (ha/t);
$hsa$	set aside land (scalar) (ha);
$LAND$	availability of land for crops (scalar) (ha);
$\mathbf{D}$	matrix where yields inverse are inserted in the diagonal ( $j \times j$ ) (ha/t);
$\overline{hsa}$	set aside land according to the number of withdrawal entitlements (scalar) (ha);

<sup>3</sup> The models consider 20 crops for Veneto Region ( $j = 1, \dots, 20$ : wheat, durum wheat, maize, barley, millet, rapeseed, sunflower, soybean, pea, sugar beet, alfalfa, grassland, tomato, salad, garlic, watermelon, melon, shallot, asparagus, pumpkin, set-aside). For the Emilia Romagna Region the crops are 26 ( $j = 1, \dots, 26$ : wheat, durum wheat, maize, barley, sorghum, rice, sunflower, soybean, sugar beet, alfalfa, grassland, grass meadow, potato, tomato, salad, garlic, watermelon, shallot, carrot, cabbage, onion, bean, fennel, bean, celery, courgette, set-aside).

<b>Heleg</b>	vector which identifies crop eligibility to be associate with entitlements (j x 1);
<i>EntAv</i>	available entitlements (scalar) (ha);
<i>aid</i>	pre-modulation aids (€);
<i>aid1</i>	aids within the threshold and not subject to modulation (€);
<i>aid2</i>	aids over the threshold and subject to modulation (€);
<i>modr</i>	modulation rate (0,05);
$x_{beet}$	amount of sugar beets produced by the macro-farm (t);
<i>YSUG</i>	beet processing output in sugar (t sugar/t sugar beet) <sup>4</sup> ;
$Q_{SUG}$	quota of sugar assigned to the macro-farm (t).

Models have been developed on a sample of 133 cereal and sugar beet producing FADN farms of three study areas located in Emilia Romagna (hilly and plain areas) and Veneto. The samples have been chosen considering only farms belonging to Type of Farming 13 (specialist cereals, oilseeds and protein crops) and 14 (general field cropping). The sample has been stratified to take into account of likely different behaviour of farmers running small, medium and large farms. Therefore, a total of 9 farm models have been developed and used for the simulations (Table 1). Only land cultivated with field crops has been considered. Permanent crops and livestock have been excluded, where present, since they are not be object of a short term planning.

**Table 1 - Size of FADN samples in the different areas of study**

<i>(n. of farms)</i>	<b>Small</b>	<b>Medium</b>	<b>Large</b>
	(0-20 ha)	(20-50 ha)	(> 50 ha)
Veneto Plain area	20	12	18
Emilia Romagna Plain area	16	26	25
Emilia Romagna Hilly area	5	3	8

*Source: elaboration on FADN data (2003).*

The sample farms are strongly specialised in COP crops and sugar beet and they show a low level of crop pattern differentiation (Table 2). This is especially true in the case of Veneto model where four crops (wheat, maize, soybean and sugar beet) use about 90% of the UAA. In these farms about 70% of the land is used for COP crops, while the 20% for sugar beet (Table 2). Forage and vegetable crops represent only 0,7% of the cultivated area. The

<sup>4</sup> Value obtained multiplying the ratio between FADN sugar beet prices and the average national price by the average coefficient of sugar output.



main cereals are maize (27%) and wheat (16%). It is also quite relevant the land cultivated with soybean (27%).

The Emilia Romagna model farms (hilly and plain areas) are less specialised because more relevance is given to vegetable and forage crops. Sugar beet use the 14% of the cultivated land (less than in the Veneto model). Indeed, in these farms rice, forage and vegetable crops cover a greater area than in Emilia models. The main cereals are maize and wheat.

**Table 2 - Crop patterns and economic results in the *baseline* situation in the farm samples**

Crop patterns			Economic results		
(% on field cropping UAA)	Em. Rom.	Veneto	(.000 €)	Em. Rom.	Veneto
Set aside	6,6	7,7	Total Production Value	19.605	9.024
COP	71,6	71,3	- cereals (%)	60,6	41,1
- cereals	63,1	43,5	- oilseeds & proteic (%)	4,1	19,6
- oilseeds & proteic	8,6	27,8	- sugar beet (%)	23,0	38,3
Forage crops	5,7	0,6	Total costs/Revenue (%) <sup>^</sup>	44,9	35,2
Sugar beet	13,7	20,3	Total aids/Revenue (%) <sup>^</sup>	22,5	25,8
Vegetables	2,5	0,1	Total aids/GM (%)	40,8	39,8
Cultivated land (ha/farm)	191,1	156,8	Unitary production value (€/ha UAA)	1.236	1.151

<sup>^</sup> Revenue = Total Production value and total direct aids.

Source: elaboration on FADN data (2003).

Economic data also show this high specialisation of the farms (Table 2): in the plain Veneto area about 61% of revenues is generated by COP crops, while the 38% of it by sugar beet. Instead, in the Emilia Romagna Region, due to rice cultivation, these values are respectively 65% and 23%.

In the Veneto sample the direct aids represent the 26% of the total income, while variable costs the 35%. In the Emilia Romagna Region aids are less influent (22%); indeed, in these farms there are higher unitary revenues as well as higher unitary variable costs. For this reason Veneto Region has a higher land unitary gross margin, whereas the farms of Emilia Romagna have a higher unitary production value (Table 2).

The models have been calibrated using 2003 data (*Baseline*). The first simulation has simulated the impact of the introduction of the Single Payment Scheme considering the decoupling of direct payments and other measures such as modulation and cross-compliance on uncultivated land (*MTR* scenario). Product and factor prices have been kept at the original 2003 level to account only for the change of the system of payment. Furthermore, to account for the reform of Common Market Organizations for sugar and fruit and vegetables additional scenario is considered (*Post-Reform* scenario). This scenario considers a decrease of sugar

beet prices and the introduction of compensatory direct payments as expected after the transitional period of the reform, and to account for the reform of CMO fruit and vegetable this scenario considers a decrease of the price of tomato for transformation, the introduction of the compensatory direct payment for this crop and the abrogation of the art. 51 constraint as expected at the end of the transition period (*Post Reform* scenario).

The post reform results (*MTR* and *Post Reform* scenarios) have been compared to the 2003 condition to underline the effect of the considered reforms. Particular emphasis is given to changes in crop patterns to show their effect in terms of decreasing cereal and COP production and of leaving some land uncultivated. The post reform condition has provided a new baseline (*Post Reform* scenario) to show the impact of the two factors considered in this paper: the abrogation of set aside requirement (*Without Set Aside* scenario) and the increase of cereal prices. Regarding cereal prices, two relative price increases have been considered: 30% and 50% (*Cereal Price Increases: 30% and 50%* scenarios). The impact of these increases has been considered without and with the set aside requirement. In this way it is possible to show the different impact of the abrogation of set aside under different cereal price conditions.

## **Simulation results<sup>5</sup>**

### ***Evolution from Baseline to post-reform conditions***

In the Emilia Romagna models the MTR reform determines a strong decrease of COP crops, especially cereals, oilseeds and proteic crops (Table 3). Sugar beet (within the available quota) and forage crops slightly increases but around 10% of the UAA remains uncultivated.

Also, in the Veneto models the MTR reform determines a strong decrease of COP crops. The areas not cultivated with COP are substituted by sugar beet, forage and vegetable crops. In this case no land is left uncultivated.

In both farm groups the CMO sugar and fruit & vegetable reforms lead to a cut of the area cultivated with sugar beet (-22,5% in Emilia Romagna and -15,7% in Veneto). This decrease allows a little recover of COP: in comparison with the baseline situation in the Emilia Romagna models the decline is reduced to less than 5% (in particular rice and soybean), while in the Veneto models there is an increase of the COP crops (+2,3%). In the Emilia Romagna models it is possible to notice a reduction of the vegetable crops, in particular tomato for processing.

In the Emilia Romagna models, the reduction of the areas cultivated with sugar beet and tomatoes determines a decrease of the uncultivated lands from 10 to 5% of the UAA intended for herbaceous crops. On the contrary, in Veneto the reduction of the sugar beet leads to the introduction of a small amount of uncultivated land. In general terms, it can be stated that the increased availability of titles (about +21% in Emilia Romagna and +26% in

---

<sup>5</sup> The shown results refer to the sum of all models of each region.

Veneto) and their greater value, orient the choices of farmers towards cereals and oilseeds and proteic crops.

**Table 3 – Crop patterns under post-reform scenarios.**

	Emilia Romagna			Veneto		
	(ha)	Var. % on Baseline		(ha)	Var. % on Baseline	
	Baseline	MTR <sup>^</sup>	Post Reform <sup>^</sup>	Baseline	MTR <sup>^</sup>	Post Reform <sup>^</sup>
COP	11.359	-15,3	-4,4	5.591	-7,8	2,3
- cereals	10.003	-14,9	-5,1	3.411	-6,0	3,0
- oilseeds & proteic	1.357	-18,3	0,7	2.180	-10,7	1,1
Forage crops	897	7,4	22,1	47	155,4	160,1
Sugar beet	2.170	7,5	-22,5	1.592	22,3	-15,7
Vegetables	394	1,2	-15,0	8	139,0	49,4
Field cropping land	14.820	-10,2	-5,7	7.239	-	-0,6
Set aside	1.040	-	-	604	-	-
Uncultivated land (% su UAA)	0,0	9,5	5,4	0,0	-	0,6
<b>Total field cropping land</b>	<b>15.859</b>	-	-	<b>7.842</b>	-	-
Uncult. with GAEC (ha) <sup>^^</sup>	-	-	24	-	-	-
Uncult. without GAEC (ha) <sup>^^</sup>	-	1.507	828	-	-	44

<sup>^</sup> MTR scenario includes SFP measures and the CMO rice reform. Post-Reform scenario includes also the reform of sugar and fruit and vegetables CMOs.

<sup>^^</sup> GAEC = Good Agricultural and Ecological Conditions.

Source: elaboration on FADN data (2003). Estimates carried out by PMP models.

In the Emilia Romagna models the considered reforms determine a clear contraction of both production value and production costs (table 4). This is due to the reduction of the areas cultivated with cereals, sugar beet and vegetable crops, to the decrease of the sugar beet price associated the CMO sugar reform and, above all, to the decision to leave some land uncultivated. On the other hand, the value of direct aids increase. Therefore, the impact on the farm gross margins is quite small. Anyhow, it is important to highlight a relevant increase of the gross margin net of the direct aids and of the sustained price of sugar beet (GM net DA&P)<sup>6</sup>, which determines a market re-orientation of the considered farms.

Also in the Veneto models both production value and costs decrease, but less than in Emilia Romagna since there are not uncultivated areas. The value of direct aids increases but, differently than in Emilia Romagna, the impact on farm gross margins is severely negative

<sup>6</sup> This gross margin does not account for the direct aids and for that portion of sugar beet (and also rice in the case of Emilia Romagna) derived from price policies. This can be considered a rough estimation of the social profitability of the farming activities as indicated by the Policy Analysis Matrix (Monke and Pearson, 1989).

because of the high production costs. Finally, there is a lower market re-orientation in comparison with that observed in the Emilia's models.

In conclusion, the analysis suggests that in the considered relatively homogeneous productive systems, farm behaviour consists in minimizing the production costs and in taking complete advantage of the available entitlements. This also results in a process of extensification proven by the decreasing value of the unitary total production observed in the post reform scenarios.

**Table 4 – Farm economic results under post-reform scenarios.**

	Emilia Romagna			Veneto		
	(.000 €)		Var. % on Baseline	(.000 €)		Var. % on Baseline
	Baseline	MTR <sup>^</sup>	Post Reform <sup>^</sup>	Baseline	MTR <sup>^</sup>	Post Reform <sup>^</sup>
Total production value	19.605	-10,3	-18,0	9.024	5,7	-16,4
- cereals (%)	60,6	54,6	66,6	41,1	36,8	50,9
- oilseeds & proteic (%)	4,1	3,8	5,1	19,6	16,6	23,7
- sugar beet (%)	23,0	27,5	13,0	38,3	44,2	23,2
Total direct aids	5.688	19,9	43,1	3.131	-2,8	27,8
- coupled comp. (%)	100	23,7	18,3	100	8,3	10,4
Modulation (% on tot. aids)	0	4,73	4,75	0	4,63	4,69
Net total direct aids	5.688	14,3	36,3	3.131	-7,3	21,9
Total costs	11.353	-15,7	-13,8	4.282	9,3	-4,2
Gross Margin (GM)	13.939	4,2	0,8	7.872	-1,4	-7,8
GM net of direct aids	8.252	-2,8	-23,7	4.742	2,5	-27,5
GM net of DA&P <sup>^^</sup>	5.869	3,7	7,2	3.361	-5,6	2,4
	Economic index			Economic index		
Unit. Prod. Value (€/ha UAA)	1.236	1.109	1.014	1.151	1.217	962
Tot. aids/Prod. Value & Tot. dir. aids (%)	22,5	27,9	33,6	25,8	24,2	34,7
Total aids/GM (%)	40,8	47,0	57,9	39,8	39,2	55,2

<sup>^</sup> MTR scenario includes SFP measures and the CMO rice reform.. Post-Reform scenario includes also the reform of sugar and fruit and vegetables CMOs.

<sup>^^</sup> GM net of DA&P: gross margin net of direct aids and price support for rice and sugar beet.

Source: elaboration on FADN data (2003). Estimates carried out by PMP models.

### ***Abrogation of set aside under baseline price conditions***

The exclusion of the set aside constraint (*Without SA* scenario) causes different effects in the farm models of the two studied regions.

In the Emilia Romagna models, this makes available about 1,000 hectares of land. Anyhow, under the price conditions of the pre-reform situation, only a small amount of this area is actually cultivated. Indeed, the total area cultivated increases of a little bit more than 1% (Table 5). This raise regards exclusively cereals, including rice, oilseed crops (soybean)

and sugar beet. The other land released from the set aside remains uncultivated even if respecting the good agricultural and environmental conditions (GAEC) needed to obtain the entitlements. The economic impact is positive, but extremely limited. Indeed, gross production and coupled direct aids slightly increase, but at the same time production costs increases, too (Table 6).

On the contrary, in the Veneto models all land released from set aside is reutilized growing COP, forage crops and sugar beet (the productive cultivated area increases of about 8%) (Table 5). This situation determines a consistent raise of both gross production and production costs, which leads to a slight increase of the gross margins (Table 6).

**Table 5 - Simulation results. Crop patterns.**

	Emilia Romagna						Veneto					
	(ha)	Var. % on post-reform scenario					(ha)	Var. % on post-reform scenario				
	Post Reform <sup>^</sup>	W/o SA	Cereal price increases				Post Reform <sup>^</sup>	W/o SA	Cereal price increases			
			With SA		Without SA				With SA		Without SA	
		30%	50%	30%	50%			30%	50%	30%	50%	
COP	10.857	1,2	9,1	12,8	12,0	20,4	5.718	8,8	3,2	4,9	11,7	13,3
- cereals	9.491	1,5	13,1	19,7	16,1	26,9	3.514	6,7	14,7	23,9	21,7	31,1
- oil. & proteic	1.366	-0,4	-18,5	-35,2	-16,7	-24,8	2.204	12,2	-15,3	-25,4	-4,2	-15,1
Forage crops	1.095	-0,2	-12,1	-21,7	-10,4	-16,4	123	31,1	-9,6	-17,6	24,6	18,8
Sugar beet	1.682	1,1	-9,7	-17,6	-6,9	-11,9	1.343	4,4	-9,6	-16,4	-4,6	-11,1
Vegetables	335	-0,1	-3,4	-5,8	-2,5	-4,0	12	13,9	33,9	37,4	93,0	127,0
Field cropping land	13.968	1,1	4,9	6,0	7,6	13,0	7.194	8,4	0,6	0,6	9,0	9,0
Set aside	1.040	-100,0	-	-	-100,0	-100,0	604	-100,0	-	-	-100,0	-100,0
Uncultivated land (% su UAA)	5,4	11,0	1,1	0,1	5,2	0,4	0,6	0,6	-	-	-	-
<b>Total field cropping land</b>	<b>15.859</b>	-	-	-	-	-	<b>7.842</b>	-	-	-	-	-
Uncult. with GAEC (ha) <sup>^^</sup>	24	867	-	-	-	-	-	-	-	-	-	-
Uncult. Without GAEC (ha) <sup>^^</sup>	828	876	170	11	828	69	44	44	-	-	-	-

<sup>^</sup> Post-Reform scenario includes SFP measure, the CMO rice reform and the reform of sugar and fruit and vegetables CMOs.

<sup>^^</sup> GAEC = Good Agricultural and Ecological Conditions.

Source: elaboration on FADN data (2003). Estimates carried out by PMP models.

On the whole, the impact of the removing the set aside constraint results, in both regions, extremely limited in terms of economic results. In the Veneto region an increase of some crops, including cereals, is shown. In the Emilia Romagna region, current price conditions prevent the cultivation of the areas released from the set aside, showing how these farm models seem to have a greater level of rigidity and a scarce re-organization attitude than in the Veneto's farms.

### **Cereal price increases**

In the Emilia Romagna models, a 30% increase in the cereal prices determines the immediate cultivation a large share of the area that in the post reform conditions was

uncultivated (Table 5). This area is utilized to enlarge cereals cultivation. To this destination is also assigned part of the land previously cultivated with forage, oil seed, vegetable crops and sugar beet. A 50% increase of cereal prices determinates almost the total disappearance of uncultivated areas (with the exception of compulsory set aside). In this setting the area cultivated with cereals significantly overcomes also the pre-reform levels.

In the Veneto models the cereal prices increase leads to an expansion of these crops, which subtracts land to oil seed, forage crops and sugar beet. In respect to the pre-reform situation, the area assigned to cereals increases from 18% to 28% for the two considered price raises (table 5).

**Table 6 - Simulation results. Economic results.**

	Emilia Romagna						Veneto					
	Post Reform <sup>^</sup>	Var. % on post-riform scenario					Post Reform <sup>^</sup>	Var. % on post-riform scenario				
		W/o SA	Cereal price increases		Cereal price increases			Without SA	Cereal price increases		Cereal price increases	
			With SA	Without SA	With SA	Without SA			With SA	Without SA	With SA	Without SA
		30%	50%	30%	50%			30%	50%	30%	50%	
Total prod. value	16.075	0,8	28,2	47,3	31,1	55,9	7.541	7,3	19,9	34,9	29,0	45,2
- cereals (%)	66,6	66,9	76,5	81,3	76,6	81,3	50,9	50,1	63,6	70,7	62,4	69,2
- oil. & proteic (%)	5,1	5,0	3,2	2,2	3,2	2,5	23,7	24,8	16,7	13,1	17,6	13,8
- sugar beet (%)	13,0	13,0	9,2	7,3	9,2	7,3	23,2	22,5	17,5	14,4	17,1	14,2
Total direct aids	8.138	0,3	1,6	2,2	2,1	3,5	4.002	0,8	-0,1	-0,2	0,6	0,5
- coupled comp. (%)	18,3	18,5	19,5	20,0	20,0	21,0	10,4	11,1	10,3	10,2	11,0	10,9
Modulation (% on tot. aids)	4,75	4,75	4,75	4,75	4,75	4,76	4,69	4,69	4,69	4,69	4,69	4,69
Net total direct aids	7.752	0,3	1,5	2,2	2,1	3,5	3.815	0,8	-0,1	-0,2	0,6	0,5
Total costs	9.783	1,2	13,1	19,3	16,1	31,3	4.101	12,6	6,3	11,2	20,4	26,4
Gross Margin (GM)	14.044	0,3	24,0	41,8	25,5	44,1	7.255	0,9	17,1	29,8	19,0	32,4
GM net of direct aids	6.293	0,2	51,7	90,7	54,4	94,2	3.440	1,1	36,2	63,2	39,3	67,7
	<i>Economic index</i>						<i>Economic index</i>					
Unitary production value (€/ha UAA)	1.014	1.022	1.299	1.493	1.329	1.580	962	1.032	1.153	1.297	1.240	1.397
Total aids/Production value & total dir. aids	33,6	33,5	28,6	26,0	28,3	25,2	34,7	33,3	30,7	28,2	29,3	26,9
Total aids/GM (%)	57,9	58,0	47,4	41,8	47,1	41,6	55,2	55,1	47,0	42,4	46,7	41,9

<sup>^</sup> Post-Reform scenario includes SFP measure, the CMO rice reform and the reform of sugar and fruit and vegetables CMOs.

Source: elaboration on FADN data (2003). Estimates carried out by PMP models.

The cereal prices raise has a strong positive impact on the farm economic results. In the Emilia Romagna farms, in comparison with the post-reform condition, the total production value increases of the 28 and 47% and the gross margins of the 24 and 42% (Table 6). In the Veneto models these increases are smaller than in Emilia (20 and 35% and 17 and 30%), since in this region almost all land was already cultivated (Table 6).

In both farm groups the gross margin increases are smaller than those of the revenues because of the steady raise of production costs. The gross income net of aids remarkably raises since aids provide a smaller contribution to the determination of the revenues (Gross

Sealable Production, GSP, and direct aids) and of the gross margins if compared with the post-reform condition.

### ***Cereal price increases without set aside requirement***

The effect of the exclusion of the set aside constraint is more relevant if also cereals prices raise. In the Emilia Romagna models the area assigned to cereals increases of about 16 and 27% (while within set aside of 13 and 20%) and the total cultivated land reaches the 95 and 99.6% of the UAA (Table 5). In the case of a 30% cereals price increases, most of the set aside area becomes cultivated, while if the increase is of the 50% also all the post-reform uncultivated land is assigned to crops. In the Veneto models the area assigned to cereals increases of about 22 and 31% (while within set aside of 15 and 24%). On the contrary of Emilia Romagna models, all available land is cultivated.

The set aside exclusion permits to take a better advantage of the positive price evolution. Indeed, the gross margins increase due to the cereal prices raise is much more consistent if associated with the exclusion of the set aside constraint (Table 6). In both regions, additional increases of gross margins are recorded when cereal prices increase is associated with the set aside exclusion. Indeed, while the set aside exclusion together with the old cereal price condition generates a 0.3% increase in Emilia Romagna and a 0.9% increase in Veneto, in case of higher cereal prices the increases are more consistent: about 1.7 and 2.5%. In both regions a significant increase of the unitary revenues is confirmed, and at the same time, a raise of the production in comparison with the condition considering only the cereal prices increase is shown. Indeed, total costs show also a strong raise (table 6).

### **Conclusions**

The introduction of the SPS has generated an incentive to decrease the production of cereals, oilseeds and protein crops and, in some cases, to let a share of the available land uncultivated. In the last few years, cereal prices have sharply increased under peculiar world market conditions. Under these circumstances, the EU has abrogated the set aside requirement to allow the cultivation on idle land.

This analysis has shown that, in the considered farms, the combined effect of increasing cereal prices and set aside abrogation generates a relevant increase of cereal production and farm economic performances. However, the role of these two factors is quite different. First, the abrogation of set aside under the cereal price levels found in the pre-reform period is generating only a negligible impact in this respect. Second, the considered increases in cereal prices provide (even maintaining the set aside requirement) a strong incentive for farmers to use all available land, to increase cereal production and to improve the economic results of their farm enterprises. Indeed, the considered price increases seem able to significantly modify the economic environment in which farmers operate. Third, the set aside abrogation *per se* is able to foster cereal production and to improve farm economic

results only under the scenarios considering high cereal prices. Under these circumstances the idle land finds a productive use and the increase of cereal production generates large economic benefits.

To summarise, the analysis suggests that the abrogation of set aside constraint is very appropriate under high cereal price conditions. This allows cereal producing farmers to take advantage of the new market conditions, to respond to the increasing demand for cereal in the international markets and to eliminate the economic distortions caused by the set aside requirement. However, the analysis has shown that, at least in the considered farms, the abrogation of the set aside requirement under the low cereal prices found in the period immediately following the introduction of the SPS could have generated only a negligible impact on land use, cereal production and farm economic results.

The increases of cereal prices could be more effective than the abrogation of set aside requirement in increasing cereal production. The combination of both considered factors is expected to revert the decline of cereal production experienced in the considered farms after the introduction of the SPS even if the magnitude of this effect is strongly affected by the level of cereal prices.

## References

- ARFINI, F., PARIS, Q. (1995) - "A positive mathematical programming model for regional analysis of agricultural policies", F. Sotte (ed.), *The Regional Dimension in Agricultural Economics and Policies*, Proceedings of the 40<sup>th</sup> EAAE Seminar, June 26-28, Ancona, pp. 17-35.
- ARFINI, F., DONATI, M., PARIS, Q. (2003) - "A National PMP Model for Policy Evaluation in Agriculture Using Micro Data and Administrative Information". Contributed paper to International Conference: *Agricultural policy reform and the WTO: where are we heading?* Capri (Italy), June 23-26, 2003.
- BUYSSE, J., FERNAGUT, B., HARMIGNI, O., HENRY DE FRAHAN, B., LAUWERS, L., POLOMÉ, P., VAN HUYLENBROECK, G., VAN MEENSEL, J. (2005a) - *Quota in Agricultural Positive Mathematical Programming Models*, F. Arfini (ed.), *Modelling Agricultural Policies: State of the Art and New Challenges*, Proceedings of the 89<sup>th</sup> EAAE Seminar, February 3-5 2005, Parma, pp. 233-250.
- BUYSSE, J., FERNAGUT, B., HARMIGNI, O., HENRY DE FRAHAN, B., LAUWERS, L., POLOMÉ, P., VAN HUYLENBROECK, G., VAN MEENSEL, J. (2005b) - *Farm-based modelling of the EU sugar reform: impact on Belgian sugar beet suppliers*, European Review of Agricultural Economics, received November 2004, final version received December 2006 (in fase di pubblicazione).
- GOLAN, A., JUDGE, G., MILLER, D. (1996) - *Maximum Entropy Econometrics: Robust Estimation With Limited Data*, John Wiley, New York.



- Heckelei, T., Britz, W. (1997) - *Pre-study for a medium simulation and forecast model of the agricultural sector for the EU*, CAPRI Working Papers, University of Bonn.
- HECKELEI, T., BRITZ, W. (2000) - "Concept and explorative application of an EU-wide, regional Agricultural Sector Model (CAPRI-Project)", in Heckelei T., Witzke H. P., and Henrichsmeyer W. (eds), *Agricultural Sector Modelling and Policy Information Systems*, Proceedings of the 65th EAAE Seminar, March 29-31, 2000, Kiel, Wissenschaftsverlag Vauk, pp. 281-290.
- HOWITT, R.E. (1995) - "Positive mathematical programming", *American Journal of Agricultural Economics*, vol. 77, pp. 329-342.
- MONKE, E. A., PEARSON, S. R. (1989) - *The Policy Analysis Matrix for Agricultural Development*. Cornell University Press, Ithaca and London.
- PARIS, Q. (1993) - *PQP, PMP, Parametric Programming, and Comparative Statics*, Department of Agricultural Economics, University of California, Davis, *Lecture Notes*.
- PARIS, Q., ARFINI, F. (2000) - Funzioni di costo di frontiera, auto-selezione, rischio di prezzo, PMP e Agenda 2000, *Rivista di Economia Agraria*, n.2, giugno.
- PARIS, Q., HOWITT, R.E. (1998) - An Analysis of Ill-posed production problems using maximum entropy, *American Journal of Agricultural Economics*, vol. 80-1, pp. 124-138.
- SEVERINI, S., VALLE, S. (2007) - La riforma dell'OCM zucchero in Italia: una valutazione di impatto sui produttori bieticola di Veneto ed Emilia Romagna, *Rivista di Economia Agraria*, n.1, gennaio.
- TANGERMANN, S. (2008) - *Policies, markets and food prices: who/what to blame? What's ahead?*, Contributed paper to the XII<sup>th</sup> of the EAAE Congress: *People, Food and Environments: Global Trends and European Strategies*, August 26-29, Ghent (Belgium).

ISTAT - [www.istat.it](http://www.istat.it)