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**Potential Impact of Single Farm Payments on French Landowners'
Decisions to Withdraw Land from Production**

Douadia Bougherara and Laure Latruffe

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Potential Impact of Single Farm Payments on French Landowners'

Decisions to Withdraw Land from Production

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Potential Impact of Single Farm Payments on French Landowners' Decisions to Withdraw Land from Production

Abstract

The 2003 CAP reform introduces Single Farm Payments (SFPs) which are not fully linked to production but conditional on compliance with European directives related to environmental, food safety and animal welfare and maintaining the land in good environmental and agricultural conditions (GAEC). This paper focuses on the effects of the reform on land allocation in France. Since it is now possible to receive SFPs for land outside production but maintained in GAEC, we conducted an intentions survey in 2006 to investigate whether the CAP reform provides incentives to French landowners (operators and non-operators) to withdraw some land from production and put it into GAEC, and to identify the determinants behind the decisions.

Despite the likely difference in conversion and cross-compliance costs, operators and non-operators were shown to be equally interested in GAEC. The key variables in landowners' decisions to convert land into GAEC appear to be both monetary and non-monetary.

Keywords: farmers, Single Farm Payment, cross compliance, intentions

JEL classification: Q18, Q15

Impact potentiel des Droits à Paiements Uniques sur les décisions des propriétaires fonciers français de cesser de produire sur leurs terres

Résumé

Les Droits à Paiements Uniques (DPU), récemment introduits à la suite de la réforme de la PAC de 2003, sont des aides directes découplées de la production, qui sont octroyées pour les terres maintenues en bonnes conditions agricoles et environnementales (BCAE) comme défini par les directives européennes sur l'éco-conditionnalité. Cet article s'intéresse à l'impact de cette réforme de la PAC sur l'allocation des terres en France. La possibilité de recevoir désormais des aides directes, pour des terres qui ne sont pas en production mais simplement maintenues en BCAE, peut inciter les propriétaires fonciers (qu'ils soient exploitants de leurs terres ou non) à cesser aujourd'hui de produire sur des terres afin de les

mettre en jachère sous BCAE. Afin d'évaluer les incitations à la conversion et ses déterminants, nous avons réalisé une enquête d'intentions en 2006 auprès de propriétaires fonciers français.

Les résultats indiquent que les deux groupes enquêtés (les exploitants et les non-exploitants) ne se différencient pas dans leurs intentions de convertir des terres en jachère sous BCAE, bien qu'on puisse penser que les coûts de conversion et les coûts de la conditionnalité diffèrent entre les deux groupes. Les déterminants clefs derrière les décisions de conversion en jachère sous BCAE sont non seulement monétaires, mais incluent également des aspects non-pécuniaires.

Mots-clefs : Agriculteurs, Droit à Paiement Unique, Conditionnalité, Intentions

Classification JEL : Q18, Q15

Potential impact of Single Farm Payments on French Landowners' Decisions to Withdraw Land from Production

1. Motivation and background

The 2003 reform of the Common Agricultural Policy (CAP) continues the process of decoupling support to farmers, by introducing Single Farm Payments (SFPs) that are not fully linked to production, but that are conditional on compliance with European directives related to environmental protection, food safety and animal welfare, and on maintaining the land in good environmental and agricultural condition (GAEC). Non compliance with these requirements would result in penalties in the form of reduced SFPs. While the objective of the European regulator is to limit overproduction and the budget spent on agriculture, side effects of further decoupling are likely to be negative in terms of impacts on agricultural structures (installation of young farmers), capitalisation in land prices and land abandonment, for example. The analysis is complex since every Member State was able to choose to adapt the reform to the specific conditions of their country.

The effects of the reform on land allocation are particularly important. With the possibility of receiving SFPs for land outside production but maintained in GAEC, the CAP reform introduces a new definition of farming activities. The definition of farmed (or operated) land can now be land without agricultural production but for which several criteria need to be fulfilled (GAEC criteria). In France, the criteria for receiving SFPs for land maintenance in GAEC have been applicable since 2006, and are decided at the NUTS 3 regional level (French *départements*)¹, but should at least include: i) maintaining a plant cover on the land, ii) respecting the wildlife, iii) avoiding bush overgrowth (more details can be found in Desjeux, 2007). As a consequence, one concern expressed by institutional actors is possible land abandonment, although the extent to which land will be not used for production is not clear.

Although numerous studies have investigated the impact of the 2003 CAP reform on the farming sector in the European Union (EU) and in particular on land allocation, only a few studies used a survey of farmers' intentions. Two studies used it in addition to the alternative modelling approach, while two studies used it instead of modelling. Breen et al. (2005)

¹ NUTS means Nomenclature of Units for Territorial Statistics (European Union's Nomenclature). For example, in France NUTS 0 is the national territory, NUTS 2 is the "*Région*" and NUTS 3 is the "*Département*".

compared their modelling results based on FADN data with the intentions of 1,030 Irish farmers surveyed in autumn 2003 with regard to the 2003 CAP reform. Most of the farmers surveyed reported no change in their intentions: 50% of cattle farmers were not planning to change the number of livestock, 70% of tillage farmers were not planning to change their acreage under cereals, 50% of dairy farmers were not considering exiting the farming sector in the next 10 years. The survey results indicated that farmers were more reluctant to change as a consequence of the 2003 CAP reform than was predicted by the model. Chatellier and Delattre (2005) carried out analyses based on 2003 FADN data and completed their study with a survey of 10 farmers' intentions in the French Alps. Their analyses predicted that partial decoupling, as applied in France in the framework of the 2003 CAP reform, allowed land abandonment in mountainous areas to be mitigated compared to hypothetical full decoupling. The complementary information given by the survey was that farmers were taking their decision to produce or not on the basis of both pecuniary (SFPs level, agro-environmental contracts, profit from production) and non-pecuniary aspects (age, attitude to the job of farming, climatic conditions, etc). Basing their analysis on a survey only, Douarin et al. (2007) reported the results of an intentions survey on farmers carried out in 2005 in five EU countries (England, France, Sweden, Lithuania and Slovakia) in the framework of the project IDEMA². Comparing intentions under a benchmark scenario (continuing Agenda 2000) and a realistic scenario (2003 CAP reform as implemented in the country concerned), the authors underlined that farmers in France and in England were planning a minimal adjustment strategy, that is to say very little change in their plans, while Swedish farmers intended to exit the sector earlier under the realistic scenario. In the New Member States (Lithuania and Slovakia), however, farmers intended to stay longer and to increase their surface area and production under the realistic scenario (implementation of the CAP from accession in 2004 onwards) than in the benchmark scenario (continuing pre-accession national policy), probably due to the increase in the level of payments received by farmers post accession. However, very few farmers in the countries studied intended to convert some of their land from production into GAEC. Finally, the authors investigated the determinants of intentions, and found that besides economic indicators (indebtedness, performance), other important variables played a role in the farmers' plans, such as human capital, age, and the existence of a successor. In addition to the surveys on farmers, one study within the IDEMA

² FP6 project: "Impact of decoupling and modulation in the enlarged Union: A sectoral and farm level assessment" (<http://www.sli.lu.se/IDEMA/about.asp>).

project focused specifically on landowners. Latruffe and Davidova (2007) investigated the intentions of private owners of land farmed by corporate farms in Slovakia and the Czech Republic, using a game theory model and a survey carried out in spring 2005. The authors concluded that very few landowners intended to withdraw their land from the farms with the intention of maintaining it in GAEC and cashing the CAP subsidies themselves. Non-pecuniary characteristics were also identified as key parameters in landowners' intentions to withdraw land from production. However, these parameters were not socio-demographic characteristics, but were related to the relationship between landowners and the corporate farm who rented their land.

Our study had two aims. The first was to investigate whether the 2003 CAP reform will provide incentives to French landowners to withdraw their land from production in order to maintain it in GAEC. The second aim was to identify the factors behind the intentions. To this end, we conducted an intentions survey in summer 2006. Compared to the literature described above, our survey was innovative in the sense that it included not only farmers, but also landowners outside agriculture. Both landowners who were operators and landowners who were not operators at the time of the study were surveyed, as we expected that their behaviour would differ due to the difference in costs of conversion into GAEC and the difference in costs of cross compliance. Our study required notably surveying non-operating landowners, which is not an easy task in France. There is scarcely no available data sets on non-operating owners of agricultural land in France, and we resorted to contact an organization composed of representatives of landowners, who gave us contacts of landowners who voted for the elections of their representatives. This type of study can shed light on the impact of the latest CAP reform on land allocation in France, and therefore provide some guidance to the stakeholders of the country's farming sector for future action.

The paper is organised as follows. In the next section, we present the conceptual framework, which is based on a profit-maximisation model, and outline some conditions for land to be converted from production into GAEC. In the third section, we present an empirical validation of the theoretical propositions using data from an intentions survey of French landowners, operators or non-operators in summer 2006. Finally, in the last section we discuss our results, and their policy and research implications.

2. Conceptual framework

In this section, we first present the conceptual framework that enabled to propose hypotheses on the determinants of landowners' behaviour regarding land maintenance in GAEC. We then describe the empirical model and the survey modalities.

2.1. Theoretical model

Landowners' decisions to withdraw land from production and convert it into GAEC is a case of land-use change, where each year, French landowners can convert some land into GAEC, and each following year, they can convert it back to production. The decision rule is therefore based on the comparison of yearly returns of one hectare, whether under production or in GAEC. We therefore represent landowners' (operators' or non-operators') decisions with the help of a profit-maximisation framework, and compare marginal returns on land.

We consider a landowner who owns (if non-operator) or farms (if operator) a given area \bar{A} . This area can be allocated to production (A_{PROD}) and to GAEC (A_{GAEC}) where $\bar{A} = A_{PROD} + A_{GAEC}$. Let Π^i be landowner i 's profit with $i \in \{O; NO\}$ where O stands for operators and NO for non-operators. Π^i is composed of two parts: the return from A_{PROD} hectares of land under production plus the return from $A_{GAEC} = \bar{A} - A_{PROD}$ hectares of land in GAEC (see equation (1)).

$$\Pi^i(A_{PROD}, z^i) = R^i(A_{PROD}) + s A_{GAEC} - \psi^i(A_{GAEC}) - C^i(A_{GAEC}) \quad (1)$$

where

z^i are landowner i 's characteristics,

R^i is the return per hectare for landowner i from the land area which is under production,

s is the SFPs per hectare, received by landowner i , for land kept in GAEC,

ψ^i is the cost per hectare of cross compliance, incurred by landowner i , for land kept in GAEC,

C^i is the cost per hectare, incurred by landowner i , for converting land from production into GAEC. For non-operators, this cost includes terminating the rental contract with the tenant farmer, and acquiring SFPs.

The value of R^i depends on the landowner being operator or non-operator. The return of A_{PROD} hectares of land under production reduces to the rentals for non-operators. As for

operators, it includes the production profit, minus the cost of cross compliance for land under production, plus the SFPs (which are the same whether land is under production or kept into GAEC). Thus, R^i is defined as in equation (2) for non-operators and as in equation (3) for operators.

$$R^{NO}(A_{PROD}) = r A_{PROD} \quad (2)$$

$$R^O(A_{PROD}) = \pi(A_{PROD}) + sA_{PROD} - \phi(A_{PROD}) \quad (3)$$

where

r is the rent per hectare received by non-operators for the land area that they rent out for production,

π is the profit per hectare made by operators from the land that they produce on,

ϕ is the cost per hectare of cross compliance for land under production.

We assumed here that the first derivatives of cross-compliance cost with respect to land ($\frac{\partial \phi}{\partial A}$, $\frac{\partial \psi^O}{\partial A}$, $\frac{\partial \psi^{NO}}{\partial A}$) are negative, as more land put under cross compliance implies the possibility of economies of scale for maintenance. For the same reason, we assumed that the first derivatives of conversion cost with respect to land ($\frac{\partial C^O}{\partial A}$, $\frac{\partial C^{NO}}{\partial A}$) are negative. However, we considered that the first derivative of production profit with respect to land ($\frac{\partial \pi}{\partial A}$) was positive.

As the objective is to maximise total profit (Π^i) with respect to A_{PROD} , a landowner will decide to keep one hectare of land under production as long as the marginal return of producing on it is greater than the marginal return of keeping it in GAEC. The following year, the landowner can decide to turn this hectare to GAEC if the marginal return of doing so is greater than the marginal return of producing: the conversion is reversible. Thus, each year the decision rule per hectare of land is to keep under production as long as equation (4) is satisfied:

$$\frac{\partial R^i}{\partial A_{PROD}} > s - \left(\frac{\partial \psi^i}{\partial A_{PROD}} + \frac{\partial C^i}{\partial A_{PROD}} \right) \quad (4)$$

Thus, operators will keep land under production as long as:

$$\frac{\partial \pi}{\partial A_{PROD}} + s - \frac{\partial \phi}{\partial A_{PROD}} > s - \left(\frac{\partial \psi^o}{\partial A_{PROD}} + \frac{\partial C^o}{\partial A_{PROD}} \right) \quad (5)$$

and non-operators will keep land in production as long as:

$$r > s - \left(\frac{\partial \psi^o}{\partial A_{PROD}} + \frac{\partial C^o}{\partial A_{PROD}} \right) \quad (6)$$

Thus, conversion of one hectare into GAEC is more likely to occur if the conditions listed in Table 2 are satisfied, for operators and non-operators respectively.

Table 2: Conditions to be satisfied for land to be converted from production into GAEC

	Operators	Non-operators
Marginal profit from land under production ($\frac{\partial \pi}{\partial A}$) is low	×	
Marginal cross-compliance cost of land under production ($\frac{\partial \phi}{\partial A}$) is high	×	
Marginal cross-compliance cost of land in GAEC ($\frac{\partial \psi^i}{\partial A}$) is low	×	×
Marginal conversion cost ($\frac{\partial C^i}{\partial A}$) is low	×	×
Rental per hectare (r) is low		×
SFPs per hectare (s) is high		×
Specific influence of household's characteristics	×	×

Three cases are possible, as illustrated on Figure 1. On this Figure, the horizontal axis corresponds to land area (A), while the vertical axis corresponds to marginal returns. The landowner represented on this Figure owns \bar{A} hectares of land. If the landowner is an operator, his/her marginal return on land is the marginal production profit plus the SFPs per hectare minus the marginal cost of cross compliance when producing ($\frac{\partial \pi}{\partial A_{PROD}} + s - \frac{\partial \phi}{\partial A_{PROD}}$),

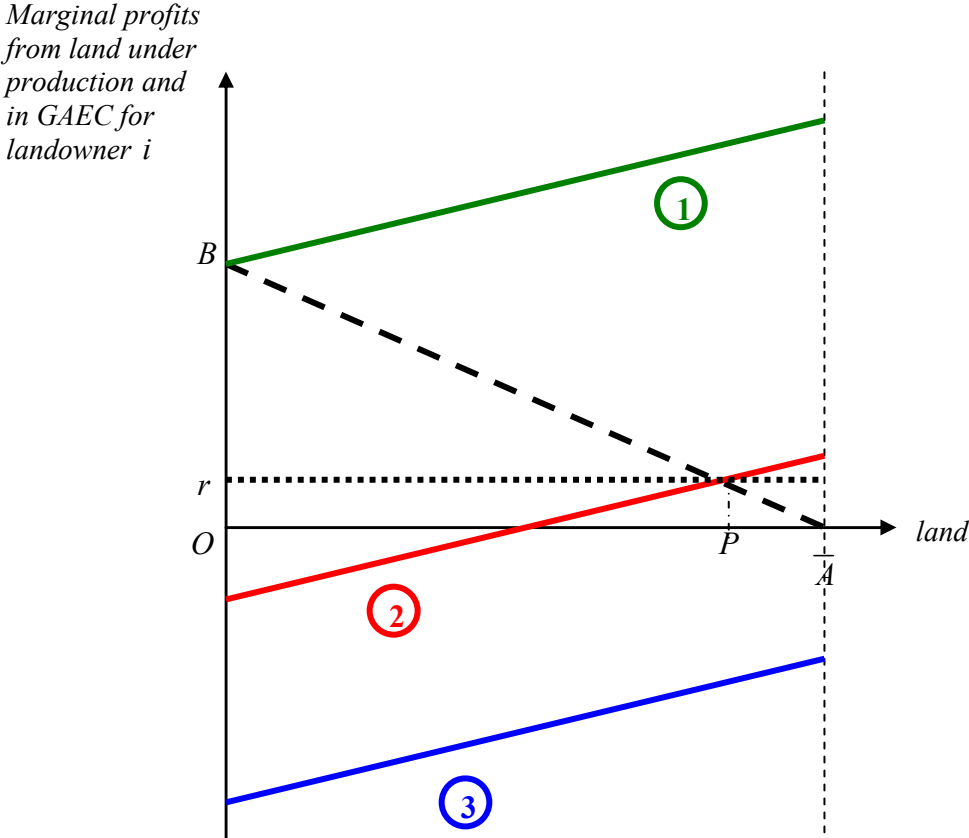
and it is represented by the downward sloping line $B\bar{A}$. If the landowner is not an operator, his/her marginal return on land is the rent per hectare (r), constant for every hectare. As for keeping land in GAEC, the marginal return of this option consists of the SFPs per hectare minus the marginal cost of cross compliance when land is in GAEC and the marginal cost of

conversion from production into GAEC ($s - \left(\frac{\partial \psi^o}{\partial A_{PROD}} + \frac{\partial C^o}{\partial A_{PROD}} \right)$), and it is represented by an

upward sloping line. Three cases are possible. In case ①, the marginal return of GAEC is

always greater than the marginal return of production (whether it is the marginal profit of production $B\bar{A}$ or the rental r), and therefore all the area \bar{A} is converted into GAEC ($A_{PROD} = 0; A_{GAEC} = \bar{A}$). In case ③, the marginal return of GAEC is always less than the marginal return of production, and therefore all the area \bar{A} is kept under production, nothing is converted ($A_{PROD} = \bar{A}; A_{GAEC} = 0$). As for the middle case ②, up to point P the marginal return of GAEC is less than the marginal return of production, while after point P it is the opposite. Therefore, OP hectares of land are kept in production, while $P\bar{A}$ hectares are converted into GAEC ($0 < A_{PROD} < \bar{A}; 0 < A_{GAEC} < \bar{A}$).

Figure 1: Illustration of the condition to convert land from production into GAEC



2.2. Empirical model for investigating the determinants of the decision

Identifying the determinants of the area converted into GAEC is our ultimate objective. However theoretically interesting, this question cannot be answered empirically with our data. The survey answers do not enable us to know how many hectares the landowners in our

sample are likely to convert, but only their to convert or not. Thus, in the empirical model, we focus on the decision to convert land into GAEC, rather than on the number of hectares that are converted. Empirically testing the determinants that influence the above decision rules (equations (5) and (6)) would rely on comparing the marginal returns on land for each landowner in the two options. However, this is impossible because many variables, such as cross-compliance cost, are unobservable. Therefore, a binary choice equation has to be used to model the decision rules. The underlying idea here is that the difference in marginal returns can be represented by an indicator function, denoted y_i^* , which is a linear combination of the factors affecting the sign of the difference in marginal returns.

$$y_i^* = \beta x_i + \varepsilon_i \quad (7)$$

where

x_i are the factors specific to the i -th landowner,

β is a vector of parameters to be estimated,

ε_i is an error term.

The decision to convert some land into GAEC by the i -th landowner is therefore represented by the following binary decision:

$$convert_i = \begin{cases} 1 & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases} \quad (8)$$

where

$convert_i$ is a binary variable taking the value 1 when the landowner i decides to convert some land into GAEC (cases ① and ② on Figure 1) or 0 when the landowner i decides to keep all land under production (case ③ on Figure 1).

As the SFPs were introduced in France only in 2006, it has not yet been possible to observe withdrawals of land from production to convert it into GAEC. Therefore, we can only use stated intentions. The latter were obtained by means of a survey, whose modalities are explained in the following section. Then, the binary model of intention (equation (8)) is estimated econometrically with a Logit model. Several variables (x_i) are introduced as proxies for monetary and non-monetary aspects in order to test for the propositions listed in Table 2. The variables are described below.

2.3. Survey modalities and variables used

French landowners' intentions were collected through a postal survey in summer 2006. Questionnaires were sent to 374 landowners in three NUTS 3 regions (French *départements*). The three regions, Calvados, Manche and Vienne, were chosen for their heterogeneity in terms of farm yields and environmental assets. Calvados and Manche are part of the NUTS 2 region Basse-Normandie, while Vienne is in the Poitou-Charentes NUTS 2 region. Landowners' addresses were provided by the APCA (*Assemblée Permanente des Chambres d'Agriculture*, Permanent Assembly of the Chambers of Agriculture), which is a federation of semi-public extension services. Their members are elected by actors of the agricultural sector. There is a Chamber of Agriculture in every *département*, whose president is a member of the APCA. The APCA is a key representative body that deals with the government and also provides services for its members. It is composed of people elected among rural and agricultural professions, and notably tenant operators, operating landowners and non-operating landowners.

The questionnaire sent to landowners at the end of July 2006 included three parts. The first part related to landowners' demographic and socio-economic characteristics (age, children, profession, education, area of rented out land, area of operated land). The second part aimed at gathering information on owned land (location, type of production, farm status, land price, land rent, future use of land, number and level of SFPs on land). In the third part, farmers were asked to express their willingness to withdraw land from production, to give their opinion on the effect of cross compliance on their activity (on revenues, on land quality, on land as an asset), and their evaluation of the cost of cross compliance on cultivated land and on land in GAEC. Thus, the questionnaire was particularly designed to measure landowners' intentions to withdraw land from production, cost of cross compliance for land under production, cost of GAEC maintenance, and land quality.

Several variables from the questionnaire were tested in the Logit model, so as to represent the theoretical propositions summarised in Table 2. These variables included the level of SFPs and rents for the respondents' land, some households' characteristics (age, education, attitude towards environment, etc.), proxies for profit from production (soil quality, location, opinion of the respondents about the potential foregone profit when converting into GAEC, etc.), proxies for GAEC cross-compliance cost and for cross-compliance cost of land under production (number of hectares expected to be converted into GAEC, number of hectares farmed, distance between residence and land, location in environmentally protected zone,

etc.), and proxies for conversion cost. The latter may differ between operators and non-operators. On the one hand, non-operators need to terminate their rental contract, purchase SFPs, and acquire the necessary cross-compliance equipment, and therefore might face high conversion cost. However, operators may be burdened with even higher conversion cost than non-operators, as operators have to give up the machinery and other inputs that they had purchased for production. Thus, it was unclear to us whether operators are less likely to be willing to convert land into GAEC. Several Logit models were tested and compared on the basis of the parameters' statistical significance and of the percentage of correct classification of respondents. The final specification includes the following variables.

- A dummy equal to 1 if respondents are operators, and 0 if they are non-operators (*operator*).
- A dummy equal to 1 if respondents feel that the effect of converting land into GAEC on their revenue will be negative, and 0 if their opinion is that the effect will be nil or positive (*effect_revenue*).
- A size variable (*size*), consisting of land owned for non-operating landowners and of land operated for operating landowners.
- A dummy equal to 1 if the land owned by the respondents is extensively farmed (*extensive*), and 0 if not.
- A dummy equal to 1 if landowners have an environmental education (*env_educ*), and 0 if not.
- A dummy equal to 1 if landowners purchased the land as a simple asset investment rather than for production, and 0 if not (*invest*).
- The age of the respondents (*age*).

3. Results

In this section we first describe the sample used and then present the results of the econometric analysis of landowners' intentions to withdraw land from production.

3.1. Description of the sample

Seventy-eight questionnaires were received, representing a return rate of 20.9%. The sample was almost equally composed of operators and non-operators. Table 3 gives some descriptive statistics for the sample. 11.5% of the sample intended to withdraw land from production and maintain it in GAEC. The population of intending landowners was composed equally of operators and non-operators. Around 57% of non-operators were former operators.

Landowners were around 60 years old and owned an average area of 87 hectares. Operators farmed 144 hectares on average. This conforms with the traditional career path in the farming sector, where farmers rent land in when they set up, and become landowners as they grow older. Only nine landowners out of 100 had any specific education with respect to the environment, whereas agricultural degrees were more common (89.5% of operators and 37.5% of non-operators). Our sample included equal proportions of respondents from the two NUTS 2 regions of our study (Basse-Normandie and Poitou-Charentes). Farms were mostly cereal oriented, the other main type being mixed production. 30.7% of the landowners have land constrained by environmental zoning. Non-operators lived far from their land more often than operators. Few landowners acquired their land for the sole purpose of acquiring an asset. Non-operators displayed more this characteristic than operators. 44.8% of the sample (mostly operators) expected cross-compliance to have a negative impact on their revenue. Finally, 7.6% of the land owned by the sample was extensively farmed, with operators tending to farm more extensively than tenants who operate land owned by non-operators.

Table 3: Sample's statistics

Variable	Description	Whole sample			Operators			Non-operators		
		#Obs.	Mean	SD	#Obs.	Mean	SD	#Obs.	Mean	SD
<i>convert</i>	The landowner intends to convert land into GAEC (=1)	78	0.115	0.322	38	0.105	0.311	40	0.125	0.335
<i>effect_revenue</i>	The landowner expects negative effects of GAEC cross compliance on land revenue (=1)	78	0.449	0.501	38	0.711	0.460	40	0.200	0.405
<i>operator</i>	The landowner is an operator (=1)	78	0.487	0.503	38	1	0	40	0	0
<i>size</i>	Number of hectares owned by the non-operating landowner / operated by the operating landowner	78	115.9	89.3	38	144.0	85.2	40	89.2	85.8
<i>extensive</i>	The land owned by the landowner is extensively farmed (=1)	78	0.077	0.268	38	0.105	0.311	40	0.050	0.221
<i>env_educ</i>	The landowner has some education in the environment (=1)	78	0.090	0.288	38	0.079	0.273	40	0.100	0.304
<i>invest</i>	The landowner bought most of her/his land for investment purposes (=1)	78	0.103	0.305	38	0.079	0.273	40	0.125	0.335
<i>age</i>	Landowner's age	78	60.1	13.9	38	50.2	8.8	40	69.5	11.1

3.2. Empirical results

Table 4 shows the results of the estimation of the Logit model and goodness-of-fit measures (maximum likelihood estimation). Marginal effects are also reported, in order to evaluate the sensitivity of the probability to convert land into GAEC for variations of explanatory variables. The interpretation is as follows. When a continuous explanatory variable increases by one unit, the marginal effect measures the resulting change in the probability of converting land into GAEC. For a discrete variable, the marginal effect measures the difference in probability estimated at the sample's mean when the dummy variable takes the value one or when it takes the value zero.

With the final specification retained, the model was highly significant and allowed us to correctly classify 88.2% of the sample in the two categories considered (intends to convert some land into GAEC vs. intends to keep all land under production), although our data display relatively high unobserved individual heterogeneity (McFadden R^2 of 0.3329).

According to the model, the state of operating land or being a landowner fully employed or retired outside agriculture at the time of the survey (*operator*), has no significant influence on the intention to withdraw land from production and to put it in GAEC. This may corroborate the above statements that operators and non-operators both have high conversion cost, and that non-operators may not have lower conversion cost than operators. The probability of maintaining land in GAEC decreases when landowners perceive a negative effect of land conversion on their revenue (*effect_revenue*). This confirms the proposition in Table 2 that conversion into GAEC is more likely to occur when the marginal profit from production is low. Respondents whose land is already farmed extensively (*extensive*) are more likely to convert to GAEC. This suggests that the third condition of Table 2 is confirmed, as land that is extensively farmed may already satisfy more GAEC criteria than land that is intensively farmed, and thus marginal conversion cost for the former type of land would be lower than for the latter. As for household's characteristics (environmental education, tendency to invest, age), the model's results indicate that they play a significant role on the intention. Landowners who are educated with respect to the environment (*env_educ*), and landowners who purchased land with a view to adding an asset to a portfolio rather than with a view to producing (*invest*), are more inclined to consider maintaining land in GAEC. But older farmers (*age*) are less likely to take the decision to start a new activity (such as GAEC) on their land, despite the fact that it could mean early retirement for them.

Table 4: Logit estimates of decision to convert into GAEC

Parameter	Estimate	Chi-Square	Marginal effect ^a
Intercept	5.2209	1.53	-
<i>operator</i>	-1.7725	1.91	-0.8368
<i>effect_revenue</i>	-2.1845	2.90(*)	-0.0997
<i>size</i>	0.0055	1.35	0.0002
<i>extensive</i>	2.5652	3.77(*)	0.3020
<i>env_educ</i>	2.7209	3.77(*)	0.3286
<i>invest</i>	2.4831	4.49(**)	0.2735
<i>age</i>	-0.1288	4.08(**)	-0.0057
McFadden's R ²			0.3329
Likelihood ratio (test)			18.5733(***)
-2 Log L			37.217
-2 Log L (intercept only)			55.790
Percent concordant			88.2%
Non-missing observations			78
Observations where <i>convert</i> =1			9

(*), (**) and (***) respectively represent a 10%, a 5% and a 1% significance level.

^a Marginal effects are computed at the sample's mean

4. Discussion and conclusion

A conceptual model representing a household facing two alternative choices enabled us to identify several decisive factors behind the conversion of land from production into GAEC, following the introduction of the SFPs (Table 2). Some of our propositions were confirmed empirically with the estimation of the determinants of French landowners' intentions to apply the conversion. Firstly, regarding monetary aspects, landowners are sensitive to the potential foregone profit if they switch from production (in case of operators) or renting out (in case of non-operators) to GAEC. This is intuitive for operators, as they still benefit from coupled premiums, which they would not receive in the case of GAEC only. However, the result is notable for non-operators, as rentals in France are highly regulated downwards and thus do not favour landowners' revenues. But non-operators may also be considering the off-farm salary they would have to give up in order to care for the land. The second monetary variable that is considered by landowners is conversion cost, which would probably be reduced for land that is farmed extensively. However, no clear-cut difference between operators and non-operators could be identified regarding conversion cost. Interestingly, no other monetary variables were identified as significant. The SFPs level does not intervene in the intention, and cross-compliance cost do not play a role either. Although many observations are missing,

some landowners in the sample evaluated the cost of cross compliance for land under production (ϕ) to be around 64 euros/ha and the cost of GAEC maintenance (ψ^i) to be around 220 euros/ha, the figures being higher for all non-operators than for operators. These evaluations would intuitively play in favour of conversion into GAEC, as expected by the two first rows of Table 2. The fact that cross-compliance cost are not identified as key variables by the econometric model might be due to the small number of observations concerning this information. Finally, non-monetary aspects play a particularly important role in landowners' intentions. Young landowners, and landowners with an environmental education and without a "productive" attitude, are more likely to transform their land into GAEC. This confirms the existing literature. Non-pecuniary characteristics have also been identified by several other studies as key parameters in landowners' or farmers' intentions to withdraw land from production following the 2003 CAP reform (Breen et al., 2005; Chatellier and Delattre, 2005; Douarin et al., 2007; Latruffe and Davidova, 2007).

Although non-operators who intend to convert their land into GAEC are as numerous as operators willing to do so, non-operators may eventually be constrained by institutional barriers in carrying out their intentions. Under the French regulation on tenant-landowner relationships, landowners cannot easily take back their land for farming. Landowners must wait until the end of their rental contract to be able to withdraw their land, and they must prove that they (or their heirs) will farm the land themselves over the next 15 years at least and they must also satisfy settlement rules (Latruffe and Le Mouël, 2006). Moreover, SFPs are allocated according to the reference years 2000-2002. Thus, non-operating landowners need to acquire SFPs before considering the opportunity to maintain land in GAEC. This is confirmed by our survey: 67% of non-operators in the sample considered the land tenure regulation to be constraining in their decision to maintain land in GAEC.

The empirical results of our study should be considered with caution. Firstly, our sample is rather small, not in itself, but because it does not enable the behaviour of the two sub-samples of operators and non-operators to be distinguished. Secondly, no time span was given with the respondents' answers, and therefore their intentions may refer to the very distant future. This suggests that the land tenure and the production supply may not be dramatically affected in France following the introduction of SFPs, and may explain why such a high rate of respondents considered the GAEC option favourably. Although their study only considered operators, Douarin et al. (2007) found a very low rate of respondents intending to put some of their land into GAEC in the five years following the survey: from 0% to 1.5% of the sample's

respondents depending on the country (England, France, Sweden, Lithuania) stated they intended to transform some of their land from production into GAEC under the scenario of implementation of the 2003 CAP. Finally, our empirical analysis relies on a survey of intentions. There is still heated debate among economists about which approach, between intentions surveys and modelling, is the best way to obtain insights into the effects of a new policy. Thomson and Tansey (1982) were among the first to point out the drawbacks of intentions surveys in farming. The authors claimed that farmers' responses might be biased if some respondents answer in a way that influences the results of the survey and thus the subsequent policy decision. This is probably not the case with our survey, as questions were framed in the research mode rather than to obtain a policy evaluation. A second weakness of the intentions survey approach, underlined by Väre et al. (2005), is that respondents devote too little time to answering the questionnaire and thus might not reveal their true preferences, even if they have already thought about them. Finally, both studies, Thomson and Tansey (1982) and Väre et al. (2005), mention a shortcoming that concerns the reliability of the intentions when they are actually carried out. The authors suggest that what the respondents actually do might not match their original intentions if farmers wrongly predict how the economic environment will change, and/or if they obtain more information following the survey. This is clearly a likely problem with our survey, although previous reports in the literature indicate that the problem might not be so serious. Thomson and Tansey (1982) reported that a survey in Scotland dairy farming in the mid-1970s regarding herd size intentions showed that between one third and one half of the respondents acted in compliance with their stated intentions. Väre et al. (2005) studied the discrepancy between planned and actual behaviour about farm succession in Finland in 1996-2001, and found that 297 out of 348 (i.e. 85.3%) farm households carried out their original intention.

In order to draw more clear-cut conclusions about the potential structural change (land tenure characteristics and production location) in French agriculture, further research is therefore necessary. One possibility is a new intentions survey once information has been more widely disseminated among landowners in France; another possibility is to monitor withdrawals of land from production one or two years after the CAP reform has been implemented. Despite these limitations, our survey enabled us to conclude that dramatic changes will not occur in France in the near future, as 44% of surveyed non-operators consider land conversion into GAEC maintenance to be far from their immediate concerns, and 80% of the operators believe that GAEC maintenance is not part of their job as farmers.

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