

# The impact of the 1990's reform on farmers retirement decisions

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Juillet 2001

## Abstract

In this paper, we examine the effects of the reform held in 1990 in France in the farming sector on the individuals retirement decisions. This reform has induced differences in the pension system changes between different areas and thus provided a “natural experiment” framework. Therefore, we can use this reform to revisit the impact of Social Security on retirement decision on French individual data. For that purpose, we apply the statistical framework developed in the recent literature on evaluating social program. Our results show that the retirement decision of farmers appear to be influenced by the changes induced by the 1990's reform.

*Keywords* : Retirement policy, Program evaluation, Farming sector

*JEL classification* : J26, C21, Q12

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<sup>‡</sup>We thank C. Bressy, E. Cahuzac, Sylvie Lambert, Thierry Magnac, P. Vaslin and the participants of the INRA applied economics seminar in Toulouse for helpful discussions and comments. The usual disclaimer applies.

# 1 Introduction

One of the most striking issue facing the developed world is the aging of its population. In virtually every developed country, there will be a steep increase in the ratio of the elderly to the working age population over the first half of the 21st century. Due to the rural out migration during the second half of the twentieth century, the increase will be greater in the farming sector.

Since the mid-1970s, much has been written about the links between these trends in labor force participation rates and the evolutions and modifications of Social Security systems (Gruber and Wise 2001, Bommier, Magnac and Roger 2000). The purpose of this paper is to revisit the impact of Social Security on retirement, using a “natural experiment” provided by the 1990 french reform of the farmers social security pension scheme. We exploit the differences in the pension system changes between different areas to identify the effect of the reform on the retirement decision of older farmers.

Two aspects are important between 1986 to 1990 for farmers pension system: (1) the gradual decrease of the legal retirement age from 65 to 60 years old between 1986 and 1990 and (2) the reform of the social contribution base in 1990. A decrease in the retirement age is the expected effect of the first aspect. The impact of the second one is less obvious. Indeed, the change in social contribution base has different effects on Social Security accrual according to the farm characteristics and the farmers professional income levels. This change can be reflected by a decrease or an increase in the SS accrual, and, thus, induce the farmers to retire sooner or later. The impact of this reform is estimated using the statistical framework recently developed in the literature on evaluating social program (Heckman, Lalonde and Smith, 1999).

The second section of this paper is devoted to a presentation of the main evolutions of the farmers pension system and in particular the 1990’s reform. The econometric model is presented in the third section and the data and results are given in the fourth.

## 2 The French Farmers Pension System

### 2.1 Main Evolutions

The first aim at setting a farmers pension system in France was the establishment of a mandatory pension system in the mid 40's. This system was really set up in 1952. Some others dispositions were progressively introduced (see the historical appendix). Until 1986 the main goal of these dispositions was to facilitate the transmission of the farms.

Since 1986, conditions for farmers retirement have been deeply modified. In particular, the legal age of retirement fell down from 65 to 60 years old. The Farmers are thus entitled to a full pension at 60 years old when they can justify for 150 insurance quarters. Nevertheless to take into account specificities of the farming sector, the retirement age was decreased step by step with one year depletion each year between 1986 to 1990.

The main change in the pension contribution system was the modification of the contribution base in 1990. The reform induces a progressive transfer from a base related to the characteristics of the farm to a new contribution base related to the professional income<sup>1</sup>. Before 1990, the contributions were calculated on a land value fixed by the French land national survey service : i.e. the farm cadastral revenue. This system had major drawbacks. In particular, the farm cadastral revenue base did not really reflect the true income. Moreover, the annual variation of the contributions was not closely linked to the annual variation of the income. The main goal of the reform has been to uniformize the French farmers pension system with the French basic general system<sup>2</sup>. This objective was pursued in particular with the 1994 reform (see the historical appendix).

### 2.2 The 1990's Reform

The 1990's reform produced some important changes in the farmers Social Security wealth. In the French system, people receive each year a number of unit ('points') proportional to their contributions. When they retire, the amount of their benefits is a function of both the total number of units they

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<sup>1</sup>The professional income tax base can be derived directly from the income level or can be a lump-sum value fixed by the fiscal administration.

<sup>2</sup>For a more complet description of the French Pension System, see Blanchet and Pelé (1997).

have accumulated since the beginning of their career and the current value of the unit ('valeur du point')<sup>3</sup>. In 1990, the rule for the computation of the number of unit received each year has been modified. To present these changes, we first need to present a brief overview of the main features of the farmers pensions system.

The farmers retirement benefit has two components : a contractual benefit and a proportional benefit. Each benefit is financed through its own tax:

\* a so called 'AVI' contribution which give access to contractual benefit ;

\* a so called 'AVA' contribution which finances the proportional benefit.

The AVA contribution has been based on the farm cadastral revenue before January, 1st 1990. The main change in 1990 is the introduction of the professional income after this date. The detailed rules of the contribution level and the number of unit received each year in 1989 and 1991 are given in Table 1 and 2.

### 3 The Econometric Model

Much has been written about the causes of the decline in the labor force participation rate of older men in the second half of the twentieth century, and in particular about the role of Social Security programs. The broad conclusion of this literature is that the underlying structure of Social Security plays a critical role in determining retirement decisions. The purpose of our model is to go thoroughly into the impact of Social Security on retirement, using a "natural experiment" provided by the 1990 french reform of the farmers social security pension system.

For that purpose we apply the statistical framework developed in the literature on evaluating social program. Evaluation methods usually try to compare potential outcomes which are associated with two regimes. Identification assumptions as well as estimation methods have been extensively studied in this context. In the simplest form of the evaluation problem (Heckman and al. 1999), persons are imagined as being able to occupy one of two mutually exclusive states : "0" for the untreated state and "1" for the treated state. Treatment is associated with participation in the program being evaluated. Associated with each state is an outcome  $Y_i$ ,  $i = 0, 1$ , or

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<sup>3</sup>The current value of the unit is fixed by law each year.

set of outcomes. In many problems, it is convenient to think of “0” as a benchmark “no treatment” state. The gain to the individual of moving from “0” to “1” is given by  $\Delta = Y_1 - Y_0$ . If one could observe both  $Y_0$  and  $Y_1$  for the same person at the same time, the gain  $\Delta$  would be known for each person. The fundamental evaluation problem arises because we do not know both coordinates of  $(Y_0, Y_1)$  and hence  $\Delta$  for anybody. By dealing with aggregates, rather than individuals, it is sometimes possible to estimate group impact measures even though it may be impossible to measure the impact of a program on any particular individual. Thus, most of the empirical work in the literature on evaluating government programs focuses on means and in particular on one mean counterfactual : the mean direct effect of treatment on those who take the treatment i.e.  $E(Y_1 - Y_0|D = 1)$  with  $D$  an indicator variable for whether the person is treated or not.

In the last years, some authors (Imbens 1999, Lechner 1999, Brodaty, Crépon and Fougère 1999) have extended the two regimes statistical framework to identify and estimate the effects of multiple treatments. These authors have adapted the previous methods to the case where mutually exclusive treatments are possible and have examined how their relative efficiency can be estimated. They assume that there are  $K + 1$  exclusive treatments, denoted  $0, 1, \dots, K$ , the value 0 corresponding to the absence of treatment. The assignment to one specific treatment  $k$  is defined by  $D_m = 1$  and the potential output associated with treatment  $k$  is denoted  $Y_k$ . In this case, the mean direct effect of treatment  $m$  on those who take the treatment  $m$  relative to treatment  $l$  is given equal to  $E(Y_m - Y_l|D_m = 1)$ . Thus, the evaluation of treatment  $m$  against treatment  $l$  is not the same as the evaluation of treatment  $l$  against treatment  $m$ .

The 1990 reform can be considered as a multiple treatments case. Indeed, the reform is unique but the rules of this reform are not homogenous and depend on the farmers living areas. In the sequel, we denote “treatment  $m$ ” and “treatment  $l$ ” two different rules for the modification of the SS accrual calculation. Thus, as Imbens (1999), Lechner (1999) and Brodaty, Crépon and Fougère (1999), we will apply the multiple treatment statistical framework. The mean direct effect of the treatment, i.e. the change in the labor participation rate of older farmers, is estimated using a matching method.

Matching methods pair program participant with members of a nonexperimental comparison group who have similar observed attributes and estimate treatment impacts by subtracting mean outcomes of matched comparison group from the mean outcomes of matched participants. A major difficulty

with the application of this method is to provide some objective way of demonstrating that a candidate partner is “otherwise comparable”. In the empirical literature on program evaluation, one of the most commonly-used evaluation strategy compares individuals before and after the program. This is a comparison strategy based on longitudinal or repeated cross-section data. It exploits the intuitively-appealing idea that persons can be in both states at different times, and that outcomes measured in one state at one time are good proxies for outcomes in the same state at other times at least for the no-treatment state.

To incorporate time into the analysis, let us introduce “t” subscripts. Assume that the program participation occurs only at time period  $k$  where  $t > k > t'$ . Let  $Y_{mt}$  be the post-program earnings of a person who participates in the program  $m$ . An evaluation entails making some comparison between “treated by treatment  $m$ ” and “treated by treatment  $l$ ” persons. If the mean change in the no-program outcome measures are the same for participants and non participants *i.e.* if the following assumption is valid :

$$E(Y_{l,t} - Y_{0,t'} | D_m = 1) = E(Y_{l,t} - Y_{0,t'} | D_l = 1)$$

an estimator of the mean direct effect of treatment  $m$  on those who take the treatment  $m$  relative to treatment  $l$ ,  $E(Y_m - Y_l | D_m = 1)$ , is given by<sup>4</sup>:

$$(\bar{Y}_{m,t} - \bar{Y}_{0,t'})_m - (\bar{Y}_{l,t} - \bar{Y}_{0,t'})_l$$

For the evaluation of the 1990 reform, the assumption induce that the retirement decision of the “ $m$ -treated” older farmers would have been the same if they had been treated by treatment  $l$ .

For each treatment  $m$  different of treatment  $l$  (taken as the reference), the estimators can be easily derived from the following equation as the  $\alpha_m$  parameters :

$$Y = X\beta + \sum_{m \neq l} \gamma_m D_m + \lambda T + \sum_{m \neq l} \alpha_m T * D_m + \varepsilon \quad (1)$$

with  $Y$  a dummy variable equal to 1 if the old farmer is working,  $D_m$  dummy variables for different treatment,  $T$  a dummy variable for whether the year is  $t$  and  $X$  a matrice of covariates that controls for observed compositional changes.

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<sup>4</sup>See Heckman and al. (1999)

## 4 Data and Empirical Strategy

The data used to estimate the impact of the 1990 reform come from two surveys undertaken by the French national statistical office (INSEE): the labor Force survey (LFS) and a survey on Financial asset (FAS). The SS accrual value in 1989 and 1991 can be computed from the FAS data (paragraph 4.1.). But, as the FAS is a cross section, we can not infer changes in the labor market participation rate of older workers from this survey. For that purpose, we have to use the annual French LFS. Nevertheless, in the LFS, some characteristics needed to calculate the farm cadastral revenue are missing. Thus in order to attribute a predicted value to the change in the SS accrual, we regress it's growth rate on explanatory variables available either in the FAS and in the LFS (paragraph 4.2). Using the predicted values, we can estimate the impact of the 1990 reform on the labor participation rate of older farmers (paragraph 4.3).

### 4.1 SS Accrual before and after the reform

The information available in the 1992 FAS<sup>5</sup> allows the calculation of the SS accrual using the 1989 and 1991 rules (see section 2). Indeed, this survey give precise information on the income level of 656 active farmers and also some technical characteristics on their farm and thus the farm cadastral<sup>6</sup> and the professional revenue.

For each farmer we can compute six values:

- the contribution amounts they should have paid in 1989 and in 1991 according to the available information on the cadastral and professional revenue in 1991. Some characteristics of the distributions of the contribution amounts are shown in Table 3. Note that the computed average contribution level for the 1991 rule is higher than for 1989.
- the number of unit they should have received in 1989 and in 1991 according to the available information on the cadastral and professional revenue in 1991. In average, the farmers receive more units for the 1991 rule than for the 1989 (see table 3).

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<sup>5</sup>Contrary to the 1986 and 1997 FAS cross sectional data , the farmer population has been over sampled in 1992 (25 percent of the sample)

<sup>6</sup>The farm cadastral revenue value for one hectare is calculated using administrative district rates.

- a SS accrual indicator in 1989 and in 1991.

Even if the contribution are higher with the 1991 rule, the greater number of units received may increase the SS accrual. Thus the impact of these two effects on intertemporel wealth and on retirement decision is ambiguous. To take them simultaneously into account, we define for each period a “unit price” :

$$p = \frac{\text{contribution amount}}{\text{number of units received}}$$

Then we calculate a growth rate of the unit price between the 1989 and the 1991 rule as a SS accrual indicator<sup>7</sup>:

$$t = \frac{p_{91} - p_{89}}{p_{89}}$$

The growth rate distribution is given by figure 1. The results show a greater increase in the contribution amount than in the corresponding pension wealth. In fact for a huge part of the sample, the growth rate of the unit price is strictly positive.

Note that two important hypothesis are required to do these calculations. First of all, the cadastral income used for calculation of both contribution amount and number of units in 1989 is determined using farm characteristics declared in 1992 on FAS. Therefore, although contributions and “points” of 1991 should theoretically be computed on the basis of past three years average income, we can not do it here and have to base this calculation on current income only.

## 4.2 Predicted SS accrual indicator

In order to attribute a predicted value to the change in the SS accrual, we regress the growth rate on explanatory variables available either in the FAS and in the labor force survey. These variables are (see table 4):

- agricultural areas: these areas are build by classification method performing a disjoint cluster analysis on the basis of distances<sup>8</sup>. French admin-

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<sup>7</sup>This indicator is more precisely a growth rate of the SS accrual indicator. To simplify the notation, we will call it only “SS accrual indicator” in the sequel.

<sup>8</sup>The clusters are estimated using the farmers fiscal status (lump-sum or real fiscal scheme), the type of the firm (individual firm, shared by family members and limited corporation) and the technical agricultural orientation.

istrative districts are divided into three clusters such that every observation belongs to one and only one cluster.

- farm surface
- technical agricultural orientation

The estimation results are shown in the table 4. The impact of the 1990s' reform varies strongly according to the technical orientation of the farms. In particular the increase is very high for market-gardeners and horticulturists.

To obtain the predicted value of the SS accrual indicator for each farmer in the LFS the farm characteristics for each individual have been multiplied by the estimated coefficient (given in table 4). Thus, the importance of the reform is known for each person.

### 4.3 The impact of the 1990 reform on retirement behavior

The data on labor market state are provided by the 1989 and 1991 waves of the annual French Labor Force survey. The French LFS is a rotating panel survey recording labor market state of individuals in randomly selected households, every year during three years. Each person is asked about the characteristics of his or her current professional occupation and for how long he or she has remained in the reported state. We limit the sample to the 894 farmers, aged 50 to 70, in the sample both in 1989 and 1991, and whose farms characteristics are known if they are not retired in 1989.

For a farmer, the importance of the reform is given by the level of his or her predicted SS accrual indicator. The empirical strategy is to compare changes in labor market situations for individuals "strongly affected" by the Social Security pension reform ( $D_S = 1$ ) to changes in labor market situations for a "less affected group" ( $D_l = 1$ ). To ensure the robustness of the results we check their sensitivity to the definition of the "strongly affected group". Hence, this group is defined for three different ceilings. It is composed successively of the farmers with a more than 25, a more than 50 and a more than 100 per cent increases in the SS accrual indicator.

The basic estimating equation, derived from the empirical model described in the third section, is :

$$ACTIVE = \alpha D * T + \gamma D + \lambda T + X\beta + \varepsilon$$

The dependent variable *ACTIVE* is a binary indicator of whether the individual is working or retired. *D* is an indicator variable for whether the

person is strongly affected or not by the Social Security reform.  $T$  is an indicator variable for whether the year is 1991 or not and  $X$  is a matrix of covariates that controls for observed compositional changes. It consists of age, age squared and dummies for gender and area of the country as defined in the previous section. The error terms  $\varepsilon$  are assumed to be not correlated through time.

The key variable of interest  $-D * T$  measures changes in labor market behavior between 1989 and 1991 among the “strongly affected” treatment group relative to changes in labor market behavior over the same period for the other group. The identifying assumption is that trends in the retirement behavior among those two groups would have been similar if the reform had not occurred.

The estimated model is a probit model robust to clustering to take into account the panel component of our data. Table 5 presents the estimated effect of the reform on labor market behaviors. Columns (1) to (3) reports the estimated coefficients for the three ceilings. The three estimations yield similar results. They indicate a statistically significant decline in the labor market participation among the “strongly affected group” relative to the “less affected group” ( $\alpha$  negative and significant). A decrease of the SS accrual at older ages has an impact on the work decisions of older persons. Thus, retirement decisions appear to be influenced by the change of the SS accrual value.

## 5 Conclusion

The main issue of this paper is to provide some evidence that the retirement decision of the older farmers have been influenced by the 1990 french reform of the farmers social security pension scheme. The impact level of the reform has been particularly high for the farmers with the highest production return as market-gardeners and horticulturists. The labor participation rate of the farmers deeply affected by the reform (the farmers with the biggest decrease in their SS accrual) is lower than the one of the other farmers in 1991. This result corroborate the viewpoint previously suggested that the underlying structure of SS plays a critical role in determining retirement decision. These results may however be considered carefully. Indeed, due to the small size of our sample we can not consider the correlation through time of the error terms.

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## Appendix : Main historical evolution of the farmers pension scheme

<b>Dates</b>	<b>Decisions</b>
<b>1952</b>	Set up of the farmers mandatory pension scheme
<b>1978</b>	Set up of the mandatory protection rule for all self-employed people (farmers including)
<b>Before 1986</b>	All decisions were set up for inciting the farmers to retire with dispositions to facilitate the transmission of the farms.
<b>1986</b>	The legal retirement age was decreased for the farmers from 65 to 60 years old. These people are entitled to a full pension if they have more than 150 quarters of contribution (37.5 years). The decision was set up on January 1st 1990
<b>1990</b>	The reform of the social contribution base for farmers. This reform consists of a progressive transfer from cadastral revenue to professional income.
<b>1994</b>	Harmonization law of all pension schemes (Madelins' law)

TABLE1 : Calculation of the contribution amount

AVI		AVA with ceiling	AVA without ceiling
<b>1989</b>	<b>Contribution =</b>		
<i>Farm cadastral revenue in brackets (in francs)</i>	<i>Contribution amount (in francs)</i>	Ceiling value = 31448 FF Contribution =	
Over 23588 FF	2010	Farm cadastral revenue * (technical rate + complementary rate) [i] - 462 [ii]	
8908.01 - 23588	1390		
3932.01 - 8908.01	980		
2055.01 - 3 932.01	607		
Less or equal to 2055	532		
+ 0,55 % * Farm cadastral revenue			
<b>1991</b>	<b>Contribution =</b>	<b>Contribution =</b>	<b>Contribution =</b>
<i>Farm cadastral revenue in brackets (in francs)</i>	<i>Contribution amount (in francs)</i>	Contribution1 + Contribution2 where	Technical rate. * professional income + complementary rate
over 31698 FF	3020	Ceiling value = 136080 Francs	Ceiling value = 31698 Francs
23775.01 - 31698	2420	Contribution1=	Contribution2=
8979.01 - 23075.01	1570	0,9	0,1
3964.01 - 8979.01	1180	* professional income	*Farm cadastral revenue [iii]
2071.01 - 3964.01	740	*( Technical rate +	
Less or equal 2071	532	Complementary rate	
		Technical rate =7,41%	Technical rate =1,155%
		Complementary rate =1,78%	Complementary rate =0,16% ±17%
		±17%	

(1)

(1)

[i] : by administrative district

[ii] : if the farm head is a full time worker

[iii] : contributions calculation based on the 1989 Farm cadastral revenue brackets

(1) : the annual amount contribution (technique or complementary) must be lower than the annual amount contribution generated by an income equal to 400 times of the minimum wage fixed at january, 1st of the year of the contributions (i.e : 400\*31.94 Francs = 12 776 Francs in 1991)

**TABLE 2 : Calculation of the number of units received**

**1989**

<b>Farm cadastral revenue</b>	<b>Number of units</b>
Over 15724 F	60
8908.01 - 15724 F	45
1887.01 - 8908 F	30
Less or equal to 1887 F	15

**1991**

<b>Professional income</b>	<b>Number of units</b>
Less or equal to 400 times of the minimum wage (SMIC)	16
400 times to 800 times of the minimum wage	16 to 30 $P = 16 + 14 * ( \text{professional income} - 400 \text{ SMIC} ) / ( 400 \text{ SMIC} )$
800 times of the minimum wage to 2 times of the amount contributive minimum (CM)	30
2 times of the amount contributive minimum (CM) to the SS annual contribution ceiling	30 to M (M = maximum number of units) $P = 30 + ( (M-30) * ( \text{income} - 2 \text{ MC} ) / ( \text{SS ceiling} - 2 \text{ CM} ) )$
Greater or equal to the SS annual contribution ceiling	P = M (maximum number of units) $M = ( \text{SS maximum pension benefit} - \text{AVTS} ) / ( 37.5 * \text{unit value} )$

Note : The hourly minimum wage at january, 1st 1991 : 31.94F  
 The amount of the minimum contributive (CM) in 1991 : 34266.96 F (annual) and 2855.58 (monthly)  
 The amount of the SS annual contribution ceiling in 1991 : 138 060 F  
 The maximum number of units in 1991 : 78  
 The SS maximum pension benefit in 1991 : 68040 F (annual) and 5810 F (monthly)  
 The minimum pension benefit for the old workers in 1991 : 15245 F  
 The unit value in 1991 : 18.05 F

**TABLE 3 : The annual contribution amount and the number of units distributions**

	Year 1989		Year 1991	
	Contribution	Unit	Contribution	Unit
Mean	5036 F	39	8336 F	42
Standard deviation	4120 F	15	6332 F	21
Minimum	81 F	15	1605 F	16
Maximum	17435 F	60	40350 F	78
1st quartile	1591 F	30	3839 F	30
2d quartile	3916 F	30	6305 F	30
3rd quartile	7227 F	45	10688 F	62

**TABLE 4 : The SS accrual indicator regression**

Explanatory Variables	Coefficient	Standard deviation
Constant	0.14	(0.31)
Technical agricultural orientation		
• Polyculture	0.90**	(0.30)
• Market gardening and horticulture	4.96**	(0.48)
• Vineyards or fruit growing	Ref.	-
• Animals breeding	1.23**	(0.28)
• Other orientation	0.82**	(0.38)
Used agricultural land size		
• 0 to 10 hectares	1.92**	(0.26)
• 10 to 30 hectares	Ref.	-
• 30 to 50 hectares	-0.73**	(0.21)
• Over 50 hectares	-1.11**	(0.19)
Agricultural areas <sup>1</sup>		
• Group 1 : (01,11,24,32,40,44,47,51,56,62,65,66,71,79,80,89)	0.49**	(0.22)
• Group 2 : (14,15,22,29,35,43,49,50,53,59,64,69,76,85)	Ref.	-
• Group 3 : (02,03,04,05,06,07,08,09,10,12,13,16,17,18,19,20,21,23,25,26,27, ,28,30,31,33,34,36,37,38,39,41,42,45,48,54,55,57,58,60,61,63, ,67,68,70,72,73,74,77,78,81,82,83,84,86,87,88,90,95)	0.37**	(0.18)
Number of observations	656	
R <sup>2</sup>	0.36	

Note : \* significative at level 10% ; \*\* significative at level 5%.

<sup>1</sup> Figures in parenthesis are the identification number of the french administrative districts issued from the clustering procedure.

**TABLE 5 : The reform evaluation**

Explanatory Variables	Ceiling=0.25		Ceiling=0.5		Ceiling=1	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	92.62**	(13.8)	94.59**	(13.64)	90.83**	(13.26)
Age	-2.72**	(0.44)	-2.77**	(0.43)	-2.63**	(0.42)
Square Age	0.02**	(0.00)	0.02**	(0.00)	0.02**	(0.00)
<b>Gender</b>						
• Man	0.43**	(0.10)	0.45**	(0.10)	0.47**	(0.10)
• Femal	Ref.		Ref.	-	Ref.	-
<b>Agricultural areas</b>						
• Group 1	-0.34**	(0.14)	-0.30**	(0.14)	-0.30**	(0.13)
• Group 2	Ref.		Ref.	-	Ref.	-
• Group 3	-0.24**	(0.12)	-0.16	(0.11)	-0.10	(0.11)
<b>Temporally dummies</b>						
• 1989	Ref.		Ref.	-	Ref.	-
• 1991	0.42**	(0.16)	0.40**	(0.15)	0.29**	(0.12)
<b>Dummy indicator for contribution increase</b>						
• Stagnation or small	Ref.		Ref.	-	Ref.	-
• strong increase	1.69**	(0.15)	1.54**	(0.15)	1.08**	(0.14)
<b>Reform effect</b>	-0.58**	(0.21)	-0.56**	(0.20)	-0.37*	(0.20)
Sample size	1788		1788		1788	
Mc Fadden R <sup>2</sup>	0.67		0.66		0.62	
-2*Log likelihood	792		823		916	

Note : \* significant at level 10% ; \*\* significant at level 5%.

**Figure 1 : SS accrual indicator**

