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**The impact of first and second pillars' aids from CAP on  
farm profits in France**

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# THE IMPACT OF FIRST AND SECOND PILLARS' AIDS ON FARM PROFITS IN FRANCE

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## Abstract

*The aim of the paper is to present a picture of the distribution of direct aids ("first" and "second" pillars of the Common Agricultural Policy or CAP) and their impact on farm profits among France in the year 2002. Analysis on separated impacts of each of these direct support schemes on farm profits among France allowed to assess whether these aids reduce or increase gaps between average farm profits between French départements (French administrative divisions).*

Keywords: Common Agricultural Policy, direct aids, farm profit, less-favoured areas.  
JEL-classification: H23, Q18.

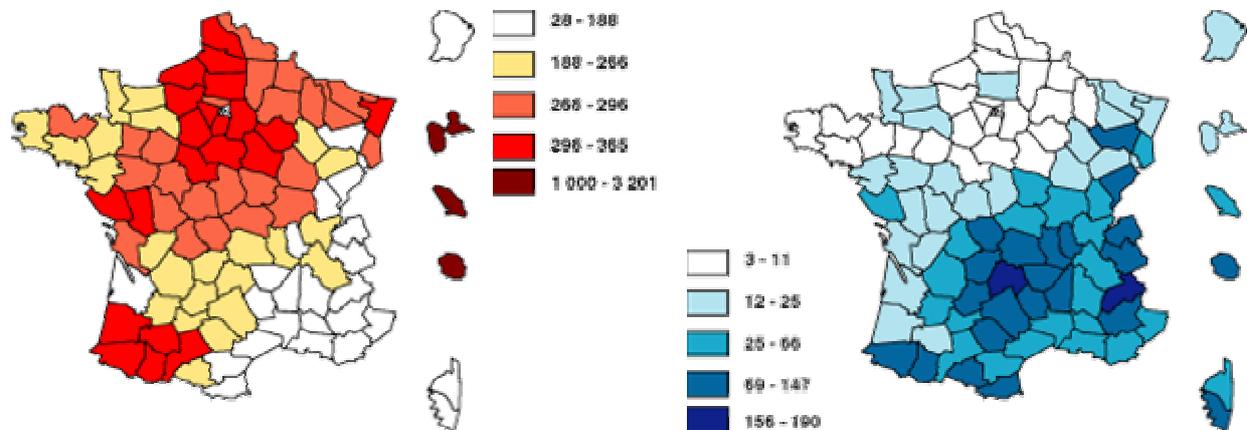
## 1 Introduction

First policy built in 1962 by the European Economic Community (EEC), the Common Agricultural Policy (CAP) has been a powerful instrument of European unification, before becoming a victim of its success and of its financial cost. Indeed, by the end of the 80's, an internal constraint (storing costs and public expenses increases) and an external one (General Agreement on Tariffs and Trade or GATT negotiations) have imposed the necessity of a radical reform. The deep policy change which took place in 1992 (« Mac Sharry » reform) has established direct payments to farmers, in order to compensate the decrease in agricultural institutional prices. These direct payments, which were equivalent to a limited part of global support until the beginning of the 90's, are contributing in 2001 overall the European Union (EU) to 42% of the producer support equivalent (PSE) calculated by the OECD (14% in 1987). The rapid increase of direct aids has been accompanied by a decrease in costs related to public intervention on markets (restitution and storing costs). The objective of reforms in the framework of the **Agenda 2000** adopted in March 1999 is to promote a model for the European agriculture which, as an economical sector, has to be multifunctional, sustainable, competitive and spread among the whole European territory, including regions with specific problems. New guiding line of this political will, the **Rural Development Regulation (RDR)** has set 22 measures, at the disposal of EU Member States, increasing and creating aids aiming at completing the agricultural markets support policy (or « **first pillar of the CAP** »). Public intervention should better than earlier contribute to landscape planning and nature protection : these aids are part of the rural development policy, or « **second pillar of the CAP** ».

The amount of first pillar's aids is closely linked to three criteria: **agricultural productions in the farm** (crop production, bovines, sheep and goats are granted through these aids), the **economical size of the farm** (size in hectares, herd size and anterior levels of production) and the **location of the farm** (important for the calculation of reference yields). Beside this, second pillar's aids, constituted of a varied panel of aids of which the most important have been selected for this study, **are not especially linked to farm's performances**, but rather to the respect of agri-environmental commitments and location in less-favoured areas.

The two maps below clearly illustrate that first pillar's aids preferably target traditional field crops regions in the Northern part of the country, while second pillar's aids rather target the mountainous and less-favoured zones. The explanation for these two facts lies in the correlation between average farm size and first pillar's aids amounts on the one hand, and in the importance of aids

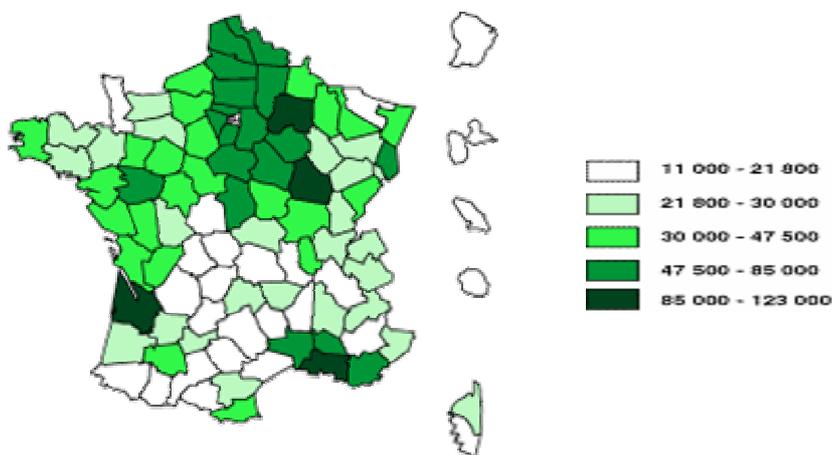
for less-favoured areas in the total amount of second pillar's aids on the other hand. Note that the allocations per support schemes are quite disproportionate. Actually, 7,1 milliards euros have been allocated to first pillar's aids in 2002; in comparison, a total of 985 millions euros were allocated to the second pillar's aids studied and illustrated here.



Source: Centre National pour l'Aménagement des Structures des Exploitations Agricoles (CNASEA), Service Central des Enquêtes et Etudes Statistiques (SCEES), 2002.

Figure 1. Total amounts in euros of direct aids per département and per hectare of utilized agricultural area (UAA). Left map: first pillar's aids. Right map: second pillar's aids.

Allowing the farmers to access additional money, these aids have of course a positive impact on their profits. However, as the map below shows it, the distribution of these profits is relatively irregular. For instance, in 2002, average farm profits per département can vary in a proportion from 1 to 10 : the map below gives an idea on the distribution of these profits among France in 2002.



Source : SCEES, 2002.

Figure 2. Average farm profits per farm and per département (in euros per year).

Farm structure, like for instance its size, the combination of agricultural productions and its location is first conditioning the maximum profit this farm can reach. Advantages and constraints conditioning farmers' choices are varying from one area to another : a crop farm in a mountainous zone will never reach the same level of profit than the same farm located in a plain zone, due mostly to machinery costs. Knowing there are differences in farm profits from one region to another, do the two support schemes contribute to modify the geographical distribution of these profits? In which way?

## 2 Material and method

### 2.1 Material

The objective was first to build a database listing “average farms” for each French département. Relevant variables have been chosen and calculated from available databases for the year 2002 (from SCEES and CNASEA): a profit (added value for the département’s average farm, free of taxes), an amount of aids for each of the two pillars, a size in hectares and a location in each of the three zones kept in the analysis (plain zone, less-favoured zone and mountainous zone).

| Zones  | Slope  | Average altitude admitted  |
|--|--|--|
| Mountainous zone                             | Superior to 20% on at least 80% of the département’s area  | 700 meters<br>(600 meters in the Vosges and 800 meters in Southern Alps) |
| Less-favoured zone (out of mountainous zone) | Definition based on demographical and economical criteria (depopulation risk with a low productivity of land, agricultural profits inferior to the national average, etc.) |  |

Table 1. Definition of less-favoured areas in France as defined in the European Regulation, 1975.

Out of the whole panel of second pillar’s aids, only six have been kept for analysis:

- the compensatory indemnity for natural handicap (ICHN);
- the prime for the preservation of extensive cattle breeding systems (PMSEE);
- the territorial farming contracts (CTE);
- agri-environmental measures (MAE), as defined in the regulation CEE N°2078/92;
- aid for afforestation;
- aid for mechanization and aid for breeding cattle constructions (both allocated to mountainous zones exclusively).

The sum of these aids per département is what is named “second pillar’s aids”. There are of course others second pillar’s aids and among them, grant for young farmers (DJA) and pre-retirement allocations. However, the money allocated to these measures represents only 20% of the total amount allocated to second pillar’s aids.

For information, the average French farm generated a profit of 37 700 euros in the year 2002 on 49,5 hectares of land. It received 14 280 euros of direct aids, equivalent to 38% of its profit. Among direct aids, 12 485 euros are first pillar’s aids and 1 795 euros second pillar’s aids, that is to say seven times less. Almost half of these second pillar’s aids are constituted of ICHN (46,7%), then CTE (32,4%) and at last PMSEE (16%). MAE are only taking part at the level of 3,8%.

For further analysis, as it was wanted to keep départements exclusively classified in one of the three natural handicap zones, 69 départements have been kept, out of the 92 metropolitan ones. For each of them, an average farm has thus been built: the following analyses are based on these 69 average farms among France in 2002, of which 22 in plain zone, 29 in less-favoured zone and 18 in mountainous zone.

### 2.2 Preliminary tests

To get a better idea on profits and direct aids distribution over the three zones, Table 2 summarizes the data collected for the year 2002.

|                    | Farm size (ha) | Farm profit (euros) | First pillar's aids (euros) | Second pillar's aids (euros) | First pillar's aids / profit (%) | Second pillar's aids / profit (%) |
|--------------------|----------------|---------------------|-----------------------------|------------------------------|----------------------------------|-----------------------------------|
| Plain zone         | 58,4           | 57 662              | 17 240                      | 549                          | <b>29,9</b>                      | <b>1,0</b>                        |
| Less-favoured zone | 58,4           | 38 847              | 16 149                      | 942                          | <b>41,6</b>                      | <b>2,4</b>                        |
| Mountainous zone   | 34,3           | 27 231              | 5 743                       | 3 109                        | <b>21,1</b>                      | <b>11,4</b>                       |

Table 2. Average characteristics per zone.

It is interesting to see how much farms, and this whatever the zone, are dependent to direct aids in building their profit. Direct aids count for **more than 30%** in each case: note the importance of first pillar's aids in less-favoured zone profits, and also the rather big amount of second pillar's aids in mountainous zone profits in comparison with the other zones.

T-tests are performed to better check whether there are significant gaps between profits and amounts of direct aids between the three different zones kept in the analysis. The software used is SAS for Windows V7. Differences between means linked to each zone are tested, depending on the equality of variances results, as illustrated in Figure 3.

#### T-Tests

| Variable | Method        | Variances | DF   | t Value | Pr >  t       |
|----------|---------------|-----------|------|---------|---------------|
| SUB1     | Pooled        | Equal     | 49   | 0.50    | 0.6215        |
| SUB1     | Satterthwaite | Unequal   | 33.3 | 0.47    | <b>0.6432</b> |
| SUB2     | Pooled        | Equal     | 49   | -3.33   | <b>0.0016</b> |
| SUB2     | Satterthwaite | Unequal   | 48.4 | -3.51   | 0.0010        |

#### Equality of Variances

| Variable | Method   | Num DF | Den DF | F Value | Pr > F        |
|----------|----------|--------|--------|---------|---------------|
| SUB1     | Folded F | 21     | 28     | 2.52    | <b>0.0229</b> |
| SUB2     | Folded F | 28     | 21     | 2.20    | <b>0.0669</b> |

Figure 3. Example of T-test results for direct aids between plain zone and less-favoured zone. SUB1: first pillar's aids. SUB2: second pillar's aids.

Reading: variances between the two distributions for first pillar's aids (SUB1) are significantly different. However, the next step using Satterthwaite method shows that there is no significant difference in first pillar's aids allocations between the two zones. This is exactly the contrary for second pillar's aids: although variances are similar between the two distributions, less-favoured zones benefit of larger amounts for these aids in average.

- Farm profits

The average farm profit is of 57 662 euros in plain zone, 38 847 euros in less-favoured zone, and 27 231 euros in mountainous zone.

T-tests reveal that profits between the three zones one from the other are significantly different.

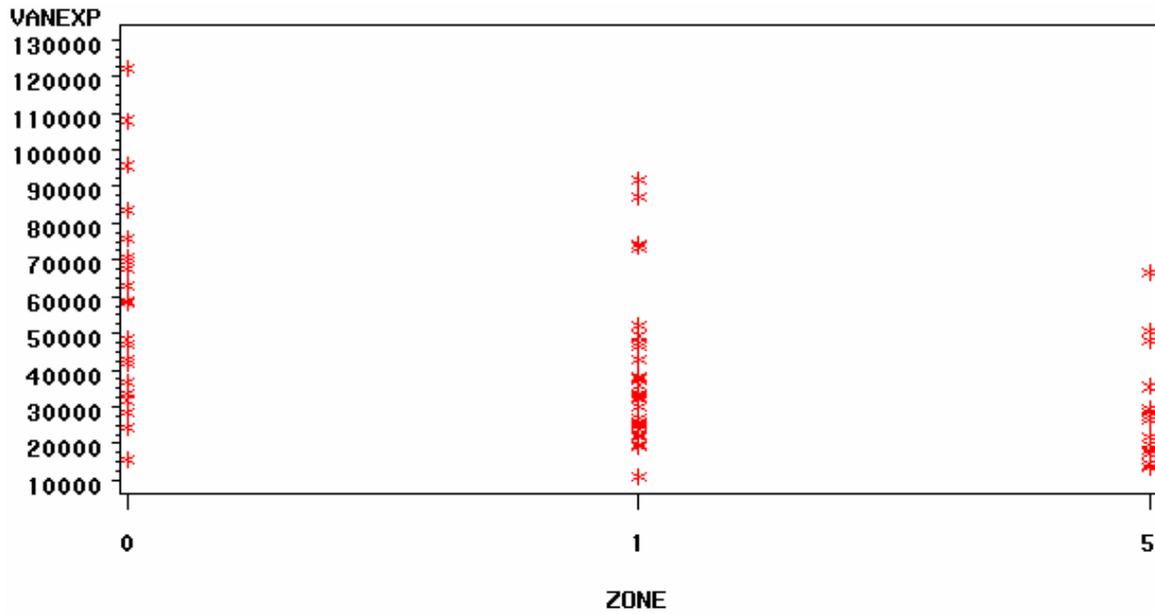


Figure 4. Distribution of farm profits among the three zones.  
 Zone 0 : plain zone. Zone 1 : less-favoured zone. Zone 5 : mountainous zone. VANEXP : farm profits in euros.

The distribution of profits is at the benefit of plain zones, followed by less-favoured zones and then mountainous zones. However, the gap in profits benefits less-favoured zones in comparison to mountainous zones to a smaller extent as what is in place between plain zones and less-favoured zones.

- Direct aids

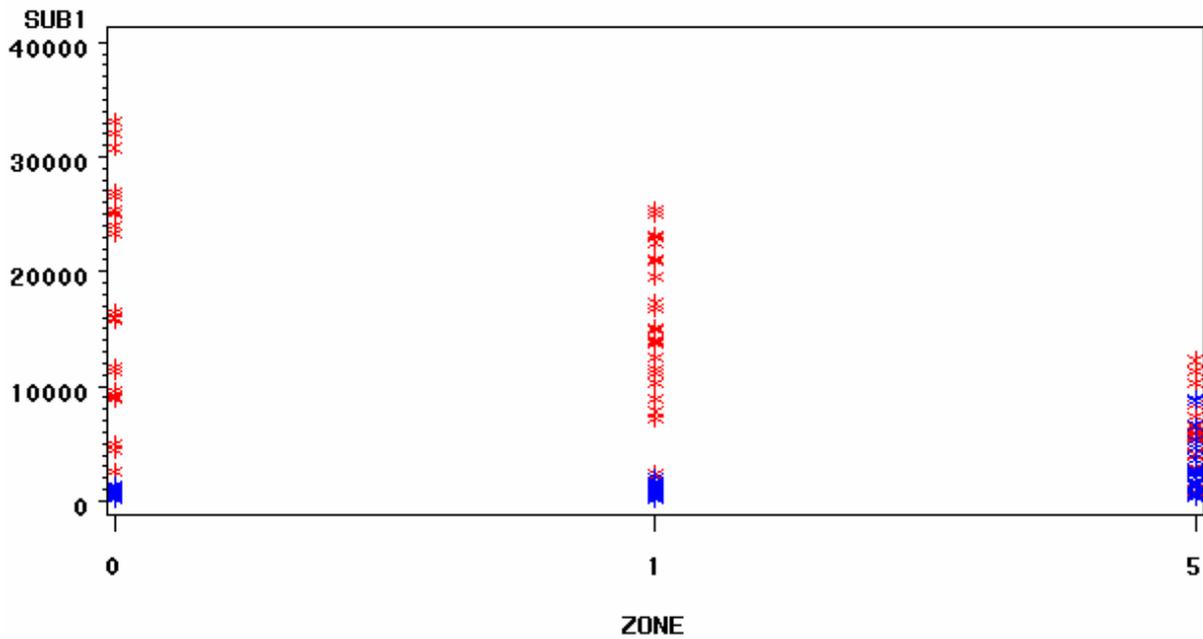


Figure 5. Distribution of direct aids among the three zones.  
 Zone 0 : plain zone. Zone 1 : less-favoured zone. Zone 5 : mountainous zone. Red asterisks : first pillar's aids. Blue asterisks: second pillar's aids.

As already described in Figure 3, no significant difference in first pillar's aids amounts exist between plain zones and less-favoured zones. This is not the case between less-favoured zones and mountain zones, and even worse between plain zones and mountain zones: the less favoured the zone, the smaller the amount of first pillar's aids. Second pillar's aids behave exactly the opposite way : the less favoured the zone, the bigger the amounts to the farm.

This last fact is to be linked with the importance of ICHN in the total amount of second pillar's aids. In 2002, 449 millions euros were allocated to this aid. As its amount per hectare is growing with naturally handicapped zones, it reaches its highest amount per hectare in mountainous zones. A regression model showed that ICHN had a strong impact on the level of second pillar's aids, and of course that high levels of ICHN were correlated to high levels of second pillar's aids. Another interesting result concerns first pillar's aids behavior. A regression model showed that high levels of first pillar's aids were correlated to big farm sizes. This result may not be surprising. The mode of allocation of first pillar's aids in 2002, linked to area of crops cultivated or to herd size, is benefiting big farm structures.

These preliminary tests helped to illustrate and introduce the main purpose of this paper: are direct aids contributing to reduce, or in the contrary increase, profit gaps between naturally handicapped zones? Which is the impact of each of these direct support scheme on profit gaps?

### 2.3 Method

Four different kinds of profits have been calculated, for each département:

- farm profit without aids (NetProfit): model 1;
- farm profit with aids from the second pillar but not from the first one (Profit2): model 2;
- farm profit with aids from the first pillar but not from the second one (Profit1): model 3;
- real farm profit (Profit): model 4.

Each of these farm profits was used as a dependent variable in covariance analysis models (ANCOVA), as the belonging to one of the three natural handicap zones was a qualitative variable. The software SAS for Windows V7 has been used to perform the analysis. The tested models are the following ones :

$$y_{ij} = \mu + \alpha_j + \varepsilon_{ij} \quad (1)$$

where :

$y_{ij}$  = log from farm profit for the département  $i$  in zone  $j$ , with  $i=1, \dots, 69$

$\alpha_j$  = zone effect with three levels,  $j=0, 1, 5$  (0: plain zone; 1: less-favoured zone; 5: mountainous zone)

$\varepsilon_{ij}$  = random variable,  $N(0, \sigma^2)$

These four different models allow to answer the question whether there is a "zone" effect on gaps between profits among the country.

Least square means (LS means) tables linked to each of these models are also built. They help to compare to which extent gaps are reduced or increased between zone for each profit type calculated.

The  $H_0$  hypothesis tested is the following one:

$$H_0 : profit_i = profit_j \quad (2)$$

where :

$profit_i$  = profits in the zone i

$profit_j$  = profits in the zone j

If the P value in the table is superior to 0,05 (critical probability chosen for the test),  $H_0$  is validated and there is no significant gap in profits between zone i and zone j. If not, then the profits are significantly different: the closer this P value to 0, the deeper the gap in profits between the two zones.

### 3. Results

The existence of gaps and their depth are compared between the three zones for each of the four farm profits calculated. Twelve sets of results are obtained.

#### 3.1 Model 1: profit without direct aids

It is important to say here that for three départements, profits without direct aids are negative. As the objective of the study is to compare relative gaps between départements belonging to different naturally handicapped zones, 5 000 euros are added to the profits without direct aids of all average farms.

The ANCOVA model validates that there is an effect of the zone on profits. Furthermore, the LS means table reveals that gaps in profits are significant between plain zones and less-favoured zones on the one hand, and between plain zones and mountainous zones on the other hand.

**But there are no difference in profits between less-favoured zones and mountainous zones.**

Pr > |t| for  $H_0: LS\text{Mean}(i)=LS\text{Mean}(j)$

Dependent Variable: NetProfit

| i/j | 0      | 1      | 5      |
|-----|--------|--------|--------|
| 0   | 1      | 0.0048 | 0.0074 |
| 1   | 0.0048 | 1      | 0.8641 |
| 5   | 0.0074 | 0.8641 | 1      |

Figure 6. Least Squares Means for effect ZONE on NetProfit. 0: plain zone. 1: less-favoured zone. 5: mountainous zone.

The LS means table illustrates how deep gaps in profits without direct aids are. This table will be later compared with the other ones linked to the three other models involving the other calculated profits.

#### 3.2 Model 2: profit only including second pillar's aids

The same problem as above occurs in this case: two départements have negative profits. 3 000 euros are added to all average farms' profits.

The model also validates the effect of the zone in profit gaps. The LS means analysis reveals there are significant gaps in profits between plain zones and the two other zones, but **there is still no significant difference in profits between less-favoured zones and mountainous zones.**

Pr > |t| for H0: LSMean(i)=LSMean(j)  
 Dependent Variable: Profit2

| i/j | 0      | 1      | 5      |
|-----|--------|--------|--------|
| 0   | 1      | 0.0043 | 0.0458 |
| 1   | 0.0043 | 1      | 0.5286 |
| 5   | 0.0458 | 0.5286 | 1      |

Figure 7. Least Squares Means for effect ZONE on Profit2. 0: plain zone. 1: less-favoured zone. 5: mountainous zone.

Gaps between plain zones and less-favoured zones are deepened in comparison with the situation without any direct aids. **But there are diminished between plain zones and mountainous zones.**

### 3.3 Model 3: profit only including first pillar's aids

The zone has here a significant effect on profits and the LS means table indicates that **gaps are significant between the three zones one with another.**

Pr > |t| for H0: LSMean(i)=LSMean(j)  
 Dependent Variable: Profit1

| i/j | 0      | 1      | 5      |
|-----|--------|--------|--------|
| 0   | 1      | 0.0060 | <.0001 |
| 1   | 0.0060 | 1      | 0.0023 |
| 5   | <.0001 | 0.0023 | 1      |

Figure . Least Squares Means for effect ZONE on Profit1. 0: plain zone. 1: less-favoured zone. 5: mountainous zone.

What is interesting here is that first pillar's aids are **reducing gaps in profits between plain zones and less-favoured zones** in comparison with the situation without any direct aids. But there are also **deepening them between mountainous zones and the two other zones.**

### 3.4 Model 4: real farm profit

We finally come to the real situation observed in the country. The ANCOVA model validates an effect of the zone on profits. Despite profits between plain zones and less-favoured are significantly different, it is to see that direct aids are very slightly reducing the gap in comparison with the situation without any direct aid.

Pr > |t| for H0: LSMean(i)=LSMean(j)  
 Dependent Variable: Profit

| i/j | 0      | 1      | 5      |
|-----|--------|--------|--------|
| 0   | 1      | 0.0053 | <.0001 |
| 1   | 0.0053 | 1      | 0.0181 |
| 5   | <.0001 | 0.0181 | 1      |

Figure 9. Least Squares Means for effect ZONE on Profit. 0: plain zone; 1: less-favoured zone; 5: mountainous zone.

The result is the same for the mountainous zone in comparison with the two other zones as in the situation with first pillar's aids: the gaps in profits are significant, though to a smaller extent with the less-favoured zone.

#### 4. Summary and conclusions

Direct aids are very important in the constitution of profits in French farms in France. For some of them, as observed for instance in Model 1 and Model 2, agricultural activities can not be performed without the access of these aids, particularly first pillar's aids.

But these support schemes do not have a neutral impact on the unequal distribution of profits between naturally handicapped zones. In the contrary, and to a different extent considering the amounts allocated for each of these schemes, they contribute either to deepen or to reduce gaps among the country, raising the question of equity in their allocation modes.

The table below summarizes the results obtained with the simple ANCOVA models used above.

|  | Is the gap significant between plain and simple less-favoured zones?                              | Is the gap significant between mountainous and plain zones?                                       | Is the gap significant between simple less-favoured and mountainous zones?                        |
|--|---|---|---|
| Farm profits without CAP directs aids                                | Yes   | Yes   | <b>No</b>   |
| Farm profits including first pillar's aids, not second pillar's ones | Yes.<br>The gap is <b>decreased</b> in comparison with the situation without any CAP direct aids. | Yes.<br>The gap is <b>increased</b> in comparison with the situation without any CAP direct aids. | Yes.<br>The gap is <b>increased</b> in comparison with the situation without any CAP direct aids. |
| Farm profits including second pillar's aids, not first pillar's ones | Yes.<br>The gap is <b>increased</b> in comparison with the situation without any CAP direct aids. | Yes.<br>The gap is <b>decreased</b> in comparison with the situation without any CAP direct aids. | <b>No.</b>  |
| Real farm profit, including all direct aids                          | Yes.<br>The gap is <b>decreased</b> in comparison with the situation without any CAP direct aids. | Yes.<br>The gap is increased in comparison with the situation without any CAP direct aids.        | Yes.<br>The gap is increased in comparison with the situation without any CAP direct aids.        |

Table 3. Results summary.

Some main conclusions can be drawn up.

With or without direct aids, plain zones profits are superior to less-favoured zones or mountainous zones profits. That is to say that directs aids do not change the hierarchy observed in the situation without their contribution.

First pillar's aids reduce profit gaps between plain zones and less-favoured zones, but increase them between mountainous zones and the two more favoured zones.

On the opposite, second pillar's aids help mountainous zones profits to remain comparable to the ones in less-favoured zones. They seem to act as a "corrective" factor in the general distribution of profits.

This snapshot of direct aids impacts on profits in France helps drawing questions related to the new CAP reform. Decoupling these directs aids from production is the main concept of the reform. The new « support package » is calculated on past payments for each farm. Well then this study clearly shows that first pillar's aids did not contribute in their allocation mode to the reduction of inequalities

overall the country. However first pillar's aids, by far the most important support scheme in terms of amounts paid among the two studied here, were not designed to have any redistribution purpose among farms, but to compensate the decrease in agricultural prices support.

On the other hand, the study shows the "corrective" role devoted to second pillar's aids. Their allocation mode and in particular the importance of ICHN for strongly naturally handicapped zones reduce gaps to the benefit of zones in which agriculture has often social and environmental important roles in addition to the economical one. Independent from farm size but closely linked to objectives not necessarily related to production, rewarding quality products with supporting economically farms performing their activities in difficult conditions, their increase in volume as foreseen in the Luxemburg agreement may help our new multifunctional agriculture to also fulfil an important CAP objective clearly expressed in the old past: "ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture".

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