How do agricultural policies influence farmland concentration?
The example of France

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Motivation and objectives

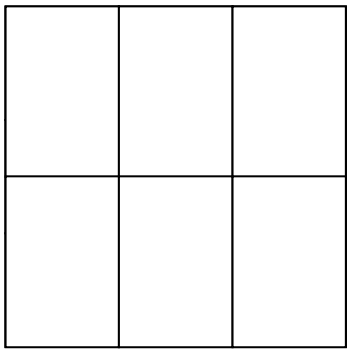
> **Two typical simultaneous trends in developed countries**

↓ Number of farms

↑ Average size of farms in terms of UAA

> **Does this mean farmland concentration (FLC) ?**

The distribution of hectares among farms



$$FLC = 0$$

> **Objectives**

Measure farmland concentration

Distribution in space and evolution in time

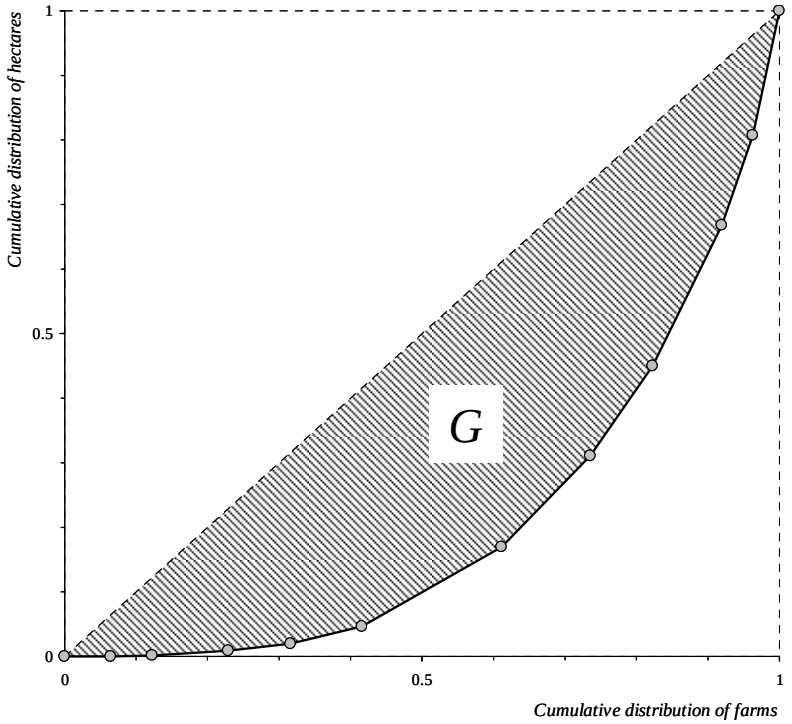
Factors influencing FLC (positively or negatively)

with particular attention on agricultural policies

Measuring farmland concentration

> The Lorenz curve and the Gini coefficient

Size Class	# farms	# hectares
Less than 1 ha	33015	12874
1 to 2 ha	28832	41894
2 to 5 ha	53985	179104
5 to 10 ha	44686	319130
10 to 20 ha	50787	729405
20 to 50 ha	98791	3361998
50 to 75 ha	62387	3846365
75 to 100 ha	44111	3825540
100 to 150 ha	49223	5972464
150 to 200 ha	22232	3812169
More than 200 ha	18871	5254886



A parametric Lorenz curve

> **A functional form proposed by Rasche *et al.* (1980)**

$$L(u) = \left(1 - (1-u)^{\alpha}\right)^{1/\beta}$$

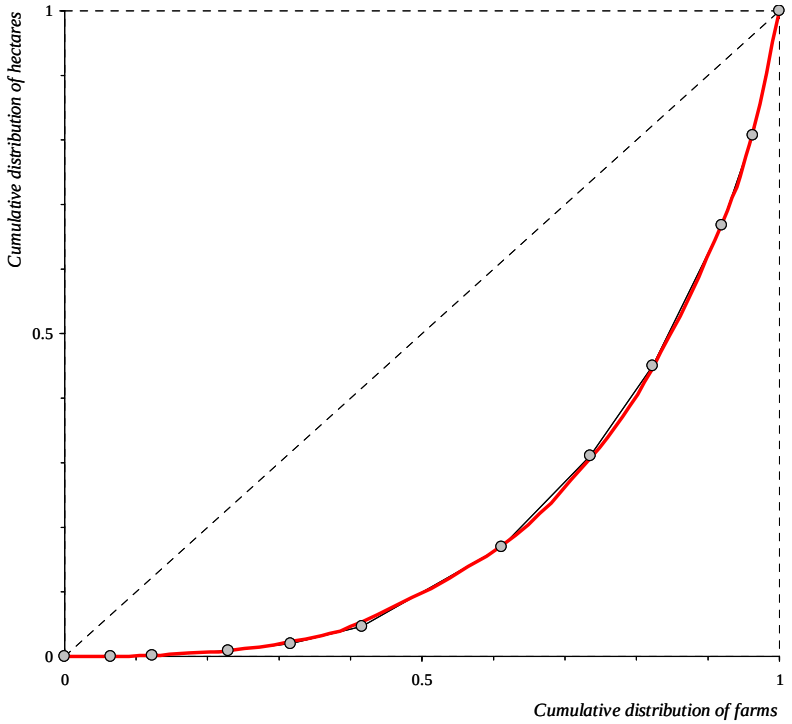
> **Then**

$$G = 1 - \frac{2}{\alpha} B(1/\alpha, 1 + 1/\beta)$$

> **In this example:**

Empirical Gini: 0.581

Parametric Gini: 0.587



A 2-step econometric approach

> **Step 1: a non linear least-square fit of the Lorenz curve**

$$h = L(n) + \varepsilon$$

$$\text{with} \quad L(n) = \left(1 - (1-u)^{\alpha}\right)^{1/\beta}$$

$$\alpha = f(X;\theta_{\alpha}) \qquad \Rightarrow \quad \hat{G} = 1 - \frac{2}{\hat{\alpha}} B\left(1/\hat{\alpha}, 1 + 1/\hat{\beta}\right)$$

$$\beta = g(X;\theta_{\beta})$$

$$0 < \alpha, \beta \leq 1$$

> **Step 2: a linear regression**

$$\hat{G} = \gamma_0 + \sum_l \gamma_l . Z_l + \varepsilon$$

Data used

> **Lorenz curves: Farm Structures Surveys for France**

12 years from 1963 to 2007

90 “départements” (NUTS3)

11 size classes (except for some dates: min. 8, max. 13)

> **Explanatory variables**

Step 1: constant, trend, fixed effects and interactions

Step 2: variables which are assumed to

- change the number and size of farms
- alleviate or favor concentration

agricultural (incl. structural) policies

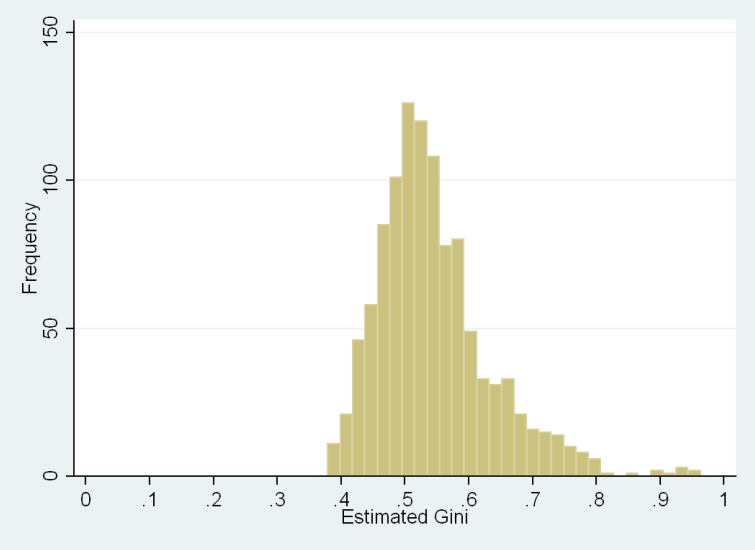
control variables

At the “département” level and lagged variables whenever possible

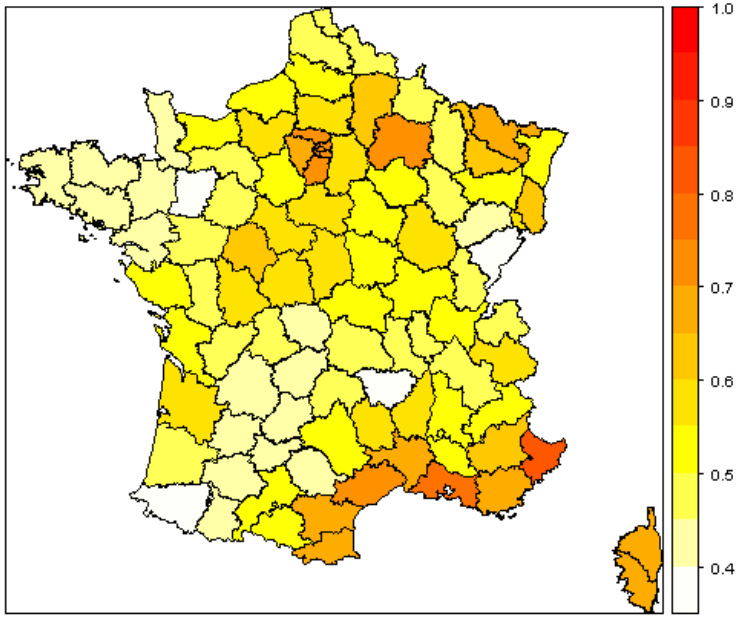
Results – step 1 (1/2)

> Adjusted R^2 = .999 (11520 obs.)

> Distribution of $\hat{G}$



all years

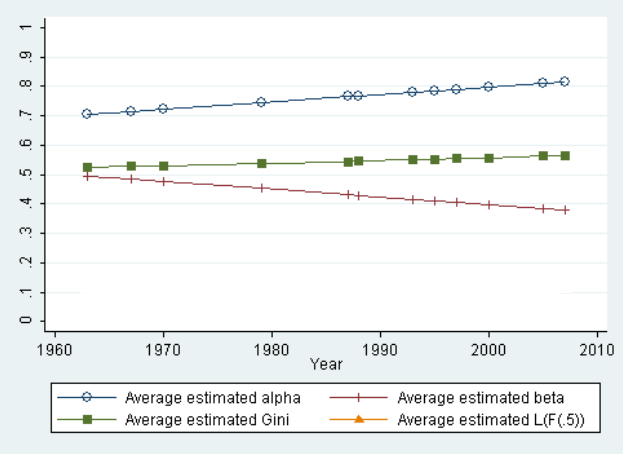


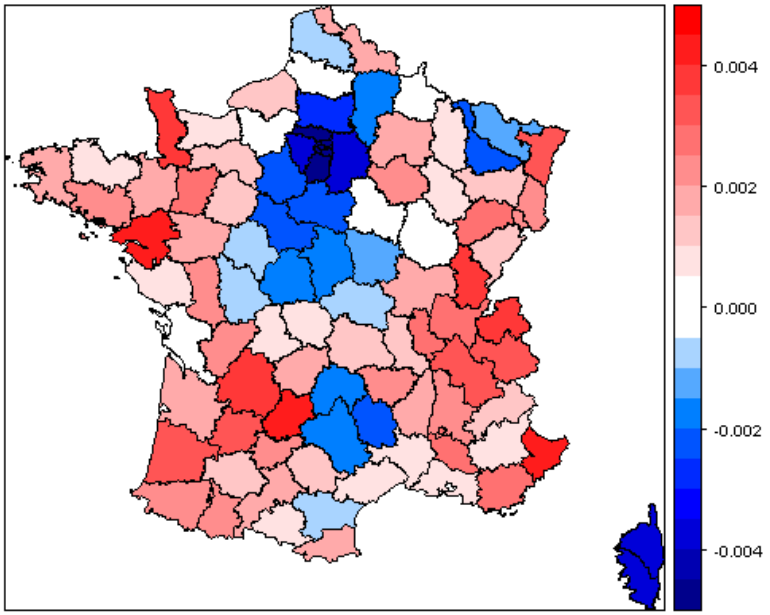
in 1967

Results – step 1 (2/2)

> The effect of time

Parameter	Estimate
α	0.00307***
	(0.00084)
β	-0.00489***
	(0.00085)





Results – step 2

	Estimate	Robust Std. Err	t stat.	P>|t|
Constant	0.1035709	0.4607447	0.22	0.822
Av. UAA 1967	**-0.0007522**	**0.0002561**	**-2.94**	**0.003**
Share >50 years old	0.8554284	0.6542553	1.31	0.191
Av. rate decrease N	-0.0852655	0.0741984	-1.15	0.251
Income / LFU (-1)	0.0000003	0.0000002	1.56	0.119
Milk Quota	**0.0712375**	**0.0420450**	**1.69**	**0.091**
Mountain. Area	**-0.0392254**	**0.0069944**	**-5.61**	**0.000**
1st Pillar (-1)	-0.0000507	0.0000916	-0.55	0.580
2nd Pillar (-1)	**-0.0009356**	**0.0003651**	**-2.56**	**0.011**
1P+2P / Prod. (-1)	**-0.1616249**	**0.0474510**	**-3.41**	**0.001**
Farmer Settl. (-1)	**-0.0000191**	**0.0000107**	**-1.79**	**0.073**
Early Retir. (-1)	**0.0003713**	**0.0001953**	**1.90**	**0.058**
Consol. area (-1)	-0.0002859	0.0002043	-1.40	0.162
SAFER's activity (-1)	0.0022338	0.0017889	1.25	0.212
Share Agr. added v. (-1)	1.2399170	1.0250420	1.21	0.227
Share UAA (-1)	**-0.2575128**	**0.0180525**	**-14.26**	**0.000**
Ar. land price (-1)	**0.0000163**	**0.0000019**	**8.58**	**0.000**

- 988 observations
- Adjusted R^2 = 0.434
- Significant at 5%
  - With positive impact
  - With negative impact
- Significant at 10%

Main conclusions

> **FLC: a multi-dimensional concept**

> **Increase in FLC is not a systematic feature**

> **Main factors influencing FLC**

Land scarcity

Structural policies (incl. milk quotas)

CAP 2nd pillar payments

Perspectives

> A one-step method

Directly derive the impact of explanatory variables on G

$$\hat{\gamma}_l = \frac{\partial \hat{G}}{\partial X_l} = \hat{\alpha}_l \frac{\partial \hat{G}}{\partial \alpha} + \hat{\beta}_l \frac{\partial \hat{G}}{\partial \beta}$$

But puzzling preliminary results:

	2 steps		1 step	
	Estimate	P>|t|	Estimate	P>|t|
…				
Share >50 years	0.8554284	0.191	-0.2059332	0.413
1P+2P / Prod (-1)	-0.1616249	0.001***	-0.1840513	0.392
SAFER's act. (-1)	0.0022338	0.212	0.0012697	0.026**
Share UAA (-1)	-0.2575128	0.000***	-0.2001216	0.000***

Any comment or suggestion?

Thank you for your attention !

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