Impact of Geographical Indications on sustainable development of territories in France

Impact des Appellations et Indications Géographiques Protégées sur le développement durable des territoires en France

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Introduction

- Geographical Indications (GIs): tools to contribute to sustainability (FAO, 2009; REGULATION No 1151/2012 of the European union).

- Literature: Effects of GIs on sustainability dimensions: large potential “if well managed” (Vandecandelaere et al. 2021):
  - Economic: Effects on price premium and net margin along the production chain (Monier-Dilhan et al., 2019; Arfini et Bellassen, 2019; Jeanneaux et al. 2019)
  - Social: employment creation, wages (Hilal et al., 2021; Bouamra-Mechemache and Chaaban, 2010)
  - Environment, landscape and biodiversity preservation (genetic and eco-systems). Local varieties, low intensive agriculture. (Hirczak and Mollard, 2004; Thévenod-Mottet, 2010; Beletti et al. 2015; Bellassen et al. 2021; Sengel et al., 2022;
Introduction

- Large majority of specific case studies: level of exploitation or sector. Difficult to be extended. Best practices or conditions for success.

- Interest for evaluation of overall effects on territories: public policy assessment.

- Few statistical quantitative assessment of the overall impact (Cei et al. 2018a, Cei et al. 2018b; Raimondi et al., 2020) at the national level:
  - Lack of data on GI locations (European E-Ambrosia Portal),
  - NUTS3 level
  - Rural development, productivity and employment. None on environmental aspects.
Question and data

• The « Observatoire de développement rural »(INRAE): host and treat large and precise data on GI and agricultural systems on the territory. [https://odr.inrae.fr](https://odr.inrae.fr)

• Data on certified operators. Over the 2012-2020 period. Geographical level of « canton » (between NUTS3 and municipality level), only food products (not wines nor spirit drinks).

• Impact evaluation of GI in France on the three dimensions of sustainability:
  
  ▶ Economic (agricultural benefits/Family work unit) (Piet et al., 2020)
  
  ▶ Social (full-time employment/ha, wages),
  
  ▶ Environmental (agricultural pressure on environment and biodiversity: water pollution, crop diversity, share of grassland) (Cherrier et al., 2021).
GI intensity index on territories on the 2012-2020 period

- 3446 cantons between 2012 and 2020.
- 2 indicators: % farms engaged in GI (intensity), Number of GI sectors involved (diversity)

Figure: GI intensity in « cantons » of France in 2012 (% farms involved and number of GI sectors)

Figure : average annual growth rate (%) of the share of farms involved in GI between 2012 and 2020
Econometric model

Difference in difference (DID) impact estimation strategy. Fixed effect regression, with $i$ the canton and $t$ the year:

$$y_{it} = \alpha_i + \gamma_t + \rho T_{it} + \delta T_{it} D_t + \sum \beta X_{it} + e_{it}$$

Outcome, successively:
- Agricultural benefits/FWU
- Agricultural employment, wage per worker
- Agriculture pressure on environment index

Continuous « Treatment » variable:
- % farms involved in GI
- Number of GI sectors

Controls:
- CAP expenditure, 2nd pilbar (Organic, investment aid, agri-environmental payments)
- % organic farmers
- UAA
- Average size of farms (UAA/farms)
- Average age of farmers

- « After treatment » dummy (1 si $t$>=2013)

\[ \rho \]: relative level of $y$ in canton with high level of GI intensity (with respect to cantons with low level of GI intensity in 2012).

\[ \delta \]: increase of $y$ caused by an increase of the treatment intensity $T_{it}$. In comparison of cantons with no increase of treatment intensity over the period.
Main results and predictive power

Selection effect:
- Economic: GI in cantons with low economic performance

Treatment effect:
- Economic: GI intensity + (10pt/11%), GI diversity (1/5%)
- Employment: GI intensity + (10pt, +2.8%), GI diversity ~
- Environment: GI intensity + (10pt, +0.2 sd), GI diversity ~

### Performance

<table>
<thead>
<tr>
<th>Economic (AB/FWU)</th>
<th>Social (ln(employment/UAA))</th>
<th>Environmental (Index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% GI farms</td>
<td>-0.7192 ***</td>
<td>-0.1287</td>
</tr>
<tr>
<td></td>
<td>(0.0800)</td>
<td>(0.0853)</td>
</tr>
<tr>
<td>Dt* % GI farms</td>
<td>1.0882 ***</td>
<td>0.2862 ***</td>
</tr>
<tr>
<td></td>
<td>(0.0711)</td>
<td>(0.0702)</td>
</tr>
<tr>
<td>GI diversity</td>
<td>-0.0612 ***</td>
<td>0.0038</td>
</tr>
<tr>
<td></td>
<td>(0.0143)</td>
<td>(0.0110)</td>
</tr>
<tr>
<td>Dt* GI diversity</td>
<td>0.0514 ***</td>
<td>-0.0122</td>
</tr>
<tr>
<td></td>
<td>(0.0132)</td>
<td>(0.0099)</td>
</tr>
<tr>
<td>% organic farms</td>
<td>-1.3759 ***</td>
<td>-0.0662</td>
</tr>
<tr>
<td>Dt %/organic farms</td>
<td>1.2594 ***</td>
<td>-0.0081</td>
</tr>
<tr>
<td>ln(CAP_2ndP)</td>
<td>-0.0118 ***</td>
<td>-0.0084 *</td>
</tr>
<tr>
<td>Dt *ln(CAP_2ndP)</td>
<td>0.0097 ***</td>
<td>0.0071 *</td>
</tr>
</tbody>
</table>

| Adj. R2 | 0.72 | 0.94 | 0.88 |
| Num. obs. | 27959 | 26976 | 16112 |

Effets fixes: Cantons, années

*Other controls included in these regressions: UAA, UAA/farms, average age of farmers

*p < 0.05, **p < 0.01, ***p < 0.001, Robust standard deviation in parenthesis
### Detailed results on environment

<table>
<thead>
<tr>
<th>Performance</th>
<th>Crop diversity</th>
<th>%grassland</th>
<th>nitrates</th>
<th>phosphorus</th>
<th>pesticides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part exploitations IG</td>
<td>-0.0067</td>
<td>0.0421</td>
<td>0.1776 **</td>
<td>0.0958</td>
<td>0.1866</td>
</tr>
<tr>
<td></td>
<td>(0.0360)</td>
<td>(0.0315)</td>
<td>(0.0688)</td>
<td>(0.1947)</td>
<td>(0.1089)</td>
</tr>
<tr>
<td>Dt* Part exploitations IG</td>
<td>-0.1078 ***</td>
<td>-0.0797 **</td>
<td>-0.2512 ***</td>
<td>0.1398</td>
<td>-0.9016 ***</td>
</tr>
<tr>
<td></td>
<td>(0.0326)</td>
<td>(0.0285)</td>
<td>(0.0616)</td>
<td>(0.1742)</td>
<td>(0.0931)</td>
</tr>
</tbody>
</table>

| Indices diversité filière IG | -0.0329 *** | -0.0254 *** | 0.0099 | 0.0223 | -0.0440 ** |
| | (0.0055) | (0.0048) | (0.0103) | (0.0291) | (0.0166) |
| Dt* Indices diversité filières IG | 0.0233 *** | 0.0373 *** | -0.0102 | 0.0048 | 0.0157 |
| | (0.0048) | (0.0042) | (0.0090) | (0.0255) | (0.0137) |

| Adj. R2 | 0.96 | 0.97 | 0.89 | 0.19 | 0.69 |
| Num. obs. | 28519 | 28573 | 21403 | 21339 | 22434 |

* *p < 0.05, **p < 0.01, ***p <0,001, Robust standard deviation in parenthesis.

Others controls included in these regressions: %Origin Farms, CAP 2nd pillar amount, UAA, UAA/farms, average age of farmers

**GI intensity:** less nitrates and pesticides in surface water

**GI diversity:** crop diversity and share of grassland
Results show an overall positive effect of GI on economic performance and a moderate effect on social performance:

- self-selection bias: GIs set more in marginal and poor areas (low benefit per FWU) (Cei et al., 2018).
- a 10 percentage point increase in share of GI farms in a canton would increase by 11% the farmers income (benefit by FWU), and by 2.8% the number of full time equivalent per ha (hired workers)
- Both intensity and diversity of GI have an economic impact.
- No significant effect found on wages or total agricultural employment.

Positive effect of GI intensity on nitrates and pesticides in surface water (less pollution) (Bellassen et al., 2021).

Positive effect of organic agriculture on farmers’ income and water quality (Coinon et Chabbé-Ferret, 2022).
Discussion

- Results confirm the relevance of GI protection policy: positive effects of intensity and diversity on sustainable development.
- Useful complement of the case study evidence.

- To go further: difference by sector, short run and long run effect (Raimondi et al. 2020), eco-toxicity of pesticides.
- Data to be gathered/collected on GI farms involved at the national level in European countries and territories (UUA involved, number of farms involved).
Thanks for your attention

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Observatoire de développement rural INRAE:
https://odr.inrae.fr
Références bibliographiques


