The Economic Impact of Growing Geographical Indications: An Impact Assessment Using FADN Data

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Introduction

The production of a geographical indication (GI) may be a tool for **fostering farms' economic results**. The ability of GI products to improve farmers' revenues is also advocated by European Regulations. Few studies have so far dealt with the issue in a systematic way. Our aim is to understand, using an **impact analysis framework**, whether the use of a GI label adds value to the farm's production.

GIs as a farmer's choice

The first step in our impact analysis is to understand which factors influence **the choice of farmers to certify** their production as a GI, instead of selling it as a "standard" version. Based on the literature on the topic, we built a model representing the profitability of the "standard" and GI version of the product. A farmer will chose to certify if the (expected) profitability of the latter is higher the (known) profitability of the former.

$$\pi_{i,S} = p_S \cdot q_{i,S} - c\left(q_{i,S}, \theta_{i,S}, \eta_i, \theta_{i,S} \cdot \eta_i\right) + a_i$$

$$\hat{\pi}_{i,GI} = p_{GI} \cdot \hat{q}_{i,GI} - c\left(\hat{q}_{i,GI}, \hat{\theta}_{i,GI}, \eta_i, \hat{\theta}_{i,GI} \cdot \eta_i\right) + \hat{\alpha}_{GI} \cdot \hat{q}_{i,GI} + \frac{\widehat{F_{GI}}}{n}$$

π: profit per hectare
p: price
q: quantity of production per hectare
c: cost function
θ: product technology parameter
η: farm's efficiency
a: promotion cost (individual)
α: certification cost
F: promotion cost (common)
n: number of GI producers
S: standard product
GI: GI product
i: i^{th} farm

Sample and variables

We used data from the **Italian FADN database**. Specifically, we considered 5 GI products: Nocciola Piemonte PGI, Mela Val di Non PDO, Toscano PGI, Riviera Ligure PDO and Umbria PDO. The treatment is a **binary variable** indicating whether a farm produce the GI or not. Control units are farms located in the **same region** (province for Mela Val di Non) and producing the **same product** without the GI certification.

GI product		Nocciola Piemonte PGI (hazelnut) ATT	T	T/C	Mela Val di Non PDO (apple) ATT	T	C/T
Nearest Neighbor		***0.40***	21	1	0.04	78	1
Caliper	$c^2 = 0.5$	***0.30***	18	6	***0.11***	70	9
	$c^2 = 1$	***0.37***	19	12	***0.15***	77	9
Coarsened Exact Matching		***0.40***	17	5	***0.08***	71	3
Inverse Probability Weighting		*0.24*	22	29	*0.10*	82	5

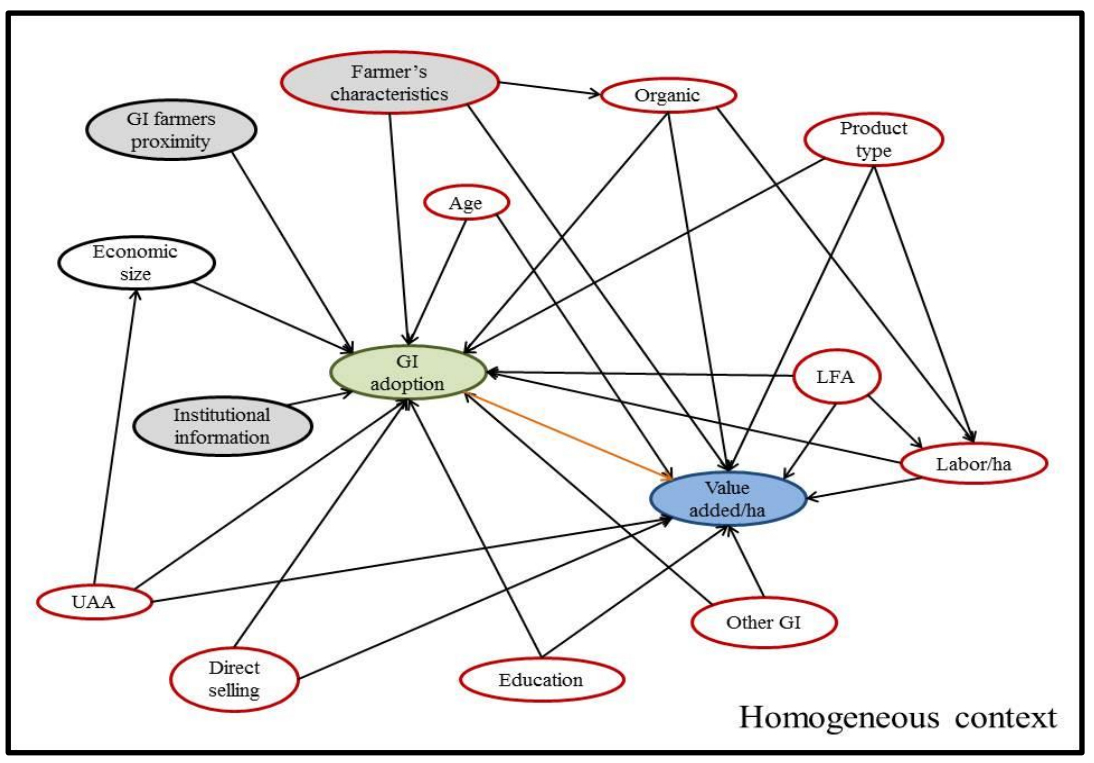
GI product		Toscano PGI (olive oil) ATT	T	T/C	Riviera Ligure PDO (olive oil) ATT	T	T/C	Umbria PDO (olive oil) ATT	T	C/T
Nearest Neighbor		***-0.14***	70	1	***0.25***	35	1	-0.04	21	1
Caliper	$c^2 = 0.5$	***-0.18***	39	6	***0.26***	30	11	0.07	8	8
	$c^2 = 1$	***-0.10***	45	8	***0.27***	30	23	0.22	11	14
Coarsened Exact Matching		0.01	50	7	***0.22***	29	5	0.16	14	15
Inverse Probability Weighting		-0.10	70	22	***0.27***	35	26	0.13	21	64

Conclusion

The GI label is able, in some cases, to **add value** to farm's products, as expected by most theoretical studies as well by the EU regulations. However, in line with other results in the literature, the GI **does not automatically guarantee** economic improvements for the producer. Identifying the **differences** between different supply chains may allow to understand the variability of results.

Interesting factors

The factors affecting the farmer's certification decision can be divided in three classes: those modifying the **actual values** of the model, those influencing the **farmer's expectations** and those altering the farmer's **risk attitude**. With the factors identified we draw a **directed acyclic graph**, to better understand the causality relationships between variables and to identify the covariates to control for.



blue: dependent variable
green: treatment variable
red-circled: variables to control for
grey-shaped: unobserved factors

Estimation strategy

To control for **observed heterogeneity** we used three matching strategies and an inverse probability weighting. The use of different methods allows to check for robustness. **Unobserved heterogeneity** deriving from farmer's unknown characteristics (link to tradition, innovativeness…) is dealt with exploiting the panel nature of FADN data using a difference-in-difference. The outcome variable (value added per hectare) was used in its logarithmic form. The average treatment effect (ATT) is obtained as:

$$ATT = \frac{1}{N_T}\left[\sum_{i \in T} \omega_T(i,j)\left(Y_{i1}^T - Y_{i0}^T\right) - \sum_{j \in C} \omega_C(i,j)\left(Y_{j1}^C - Y_{j0}^C\right)\right]$$

T: treatment group
C: control group
i, j: treated and control units
Y_t: outcome at time t
ω: weights
N_T: number of treated units

Results

Different matching methods use different numbers of treated units (T) and different control-treated ratios (C/T). However, in most cases, results are quite **robust** to the use of different methods. Methods with medium-small C/T are to be preferred. A **positive effect** of the certification on farms value added per hectare is observed for three GIs over five: Nocciola Piemonte PGI, Mela Val di Non PDO and Riviera Ligure PDO. The certification **does not significantly add value** to the oil production of Umbria PDO, while it seems to have even a **negative effect** in the case of Tuscany olive oil.