



Geographical Indications and local development: the strength of territorial embeddedness

Riccardo Crescenzi, Fabrizio De Filippis, Mara Giua & Cristina Vaquero-Piñeiro

To cite this article: Riccardo Crescenzi, Fabrizio De Filippis, Mara Giua & Cristina Vaquero-Piñeiro (2022) Geographical Indications and local development: the strength of territorial embeddedness, *Regional Studies*, 56:3, 381-393, DOI: [10.1080/00343404.2021.1946499](https://doi.org/10.1080/00343404.2021.1946499)

To link to this article: <https://doi.org/10.1080/00343404.2021.1946499>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



[View supplementary material](#)



Published online: 29 Jul 2021.



[Submit your article to this journal](#)



Article views: 3527



[View related articles](#)



[View Crossmark data](#)

Geographical Indications and local development: the strength of territorial embeddedness

Riccardo Crescenzi^a , Fabrizio De Filippis^b, Mara Giua^c  and Cristina Vaquero-Piñeiro^d 

ABSTRACT

Can Geographical Indications (GIs) promote local economic development in rural areas? This paper explores the impact of GIs that identify and endorse agri-food products which are strictly embedded within the territory from which they originate. Examining Italian wine protected by GIs through an innovative dataset and by means of propensity score matching and difference-in-differences models make it possible to compare the local economic development trajectories of rural municipalities afforded GIs with the correspondent dynamics of a counterfactual group of similar municipalities without GI status since 1951. Rural municipalities with GIs experience population growth and economic reorganization towards non-farming sectors, which frequently involve higher value-added activities.

KEYWORDS

Geographical Indications; rural development; European Union policies; local development; propensity score matching; difference-in-differences

JEL O18, Q18, R1


HISTORY Received 28 April 2020; in revised form 31 May 2021

INTRODUCTION

The globalization of production, consumption and exchange means that the competitiveness of local territories within global markets is highly dependent on their capacity to leverage their own cultural, territorial and economic specificities via the provision of supportive institutions and policies (e.g., Organisation for Economic Co-operation and Development (OECD), 2016). In particular, the success or failure of a territory's participation in the international economic topography is strongly influenced by the space-blind or space-sensitive nature of its local productive context. This is particularly true for the agri-food sector, where a special role has been occupied by products that are traditionally and strongly embedded in their territorial context (Capello, 2018) and social ties (Maghssudipour et al., 2020). These place-sensitive products distinguish themselves

from their conventional counterparts by harnessing manifold combinations of socio-economic, historical, institutional, natural and cultural features embedded in their region of origin. As Giuliani (2007) points out, in areas populated by actors with strong local knowledge bases, local knowledge communities arise thanks to inter-cluster sources and tacit knowledge exchanges. By leveraging this set of tangible and intangible territorial features, space-sensitive producers can respond to the need for product differentiation vis-à-vis the monopolistic competition that characterizes many agri-food markets in the globalized economy (Daugbjerg, 2017). From a territorial perspective, similar areas can achieve, according to their capacity for space-sensitive production, different levels of formal 'institutionalization'. In the European agri-food sector, Geographical Indications (GIs) offer a unifying framework and a legal basis for this process.


CONTACT

^a  r.crescenzi@lse.ac.uk


Department of Geography and Environment, London School of Economics and Political Science (LSE), London, UK.

^b  fabrizio.defilippis@uniroma3.it


Department of Economics and Rossi-Doria Centre, Università degli Studi Roma Tre, Rome, Italy.

^c **(Corresponding author)**  mara.giua@uniroma3.it

Department of Economics and Rossi-Doria Centre, Università degli Studi Roma Tre, Rome, Italy.

^d  cristina.vaquero@uniroma3.it

Department of Economics, Università degli Studi Roma Tre, Rome, Italy.

 Supplemental data for this article can be accessed at <https://doi.org/10.1080/00343404.2021.1946499>

According to European Union (EU) regulations, GIs are signs used for agri-food products that have a specific geographical origin and possess qualities and reputations that are essentially or exclusively due to the specific geographical environment, as a result of natural and human factors.¹ The GI identification process is initiated by local actors who propose a preliminary draft of the GI's code of practice (the product specification), and concludes with the European Commission's endorsement, after which the product can legitimately be marked with a GI. In this sense, GIs can be considered a unique case of informal institutions that are thereafter translated into a globally recognized formal regulation (Morgan, 1997; Rodríguez-Pose, 2020).

Obtaining a GI provides competitive benefits for a product in both domestic and global markets and confers greater consumer trust regarding the authenticity and distinction of products and producers, allowing producers to differentiate their products better. Besides their upward effect on product pricing, which in turn allows traditional modes of production to persist amid monopolistic competition, GIs also have important implications for local economic development. This indeed was foreseen by the first European Economic Community (EEC) Regulation on GIs: 'the promotion of products having certain characteristics could be of considerable benefit to the rural economy, in particular to less-favoured or remote areas, by improving the incomes of farmers and by retaining the rural population in these areas' (European Communities Council (EEC), 1992).

The potential contribution of the GI scheme towards achieving rural development objectives is worth investigating; even without drawing any specific budget from the EU, the GI scheme can still produce significant economic returns.

The literature on the linkage between GIs and the development of rural areas is rich (Bonanno et al., 2019; Torok et al., 2020). However, notwithstanding some relevant exceptions (Carbone et al., 2014; Cei et al., 2018; Food and Agriculture Organization (FAO), 2018) the subject has thus far mainly been investigated through qualitative studies focusing on few products, macro-regions or adopting a supply-chain approach (Kizos & Vakoufari, 2011). Conversely, the majority of studies have focused on the effects of GIs on individual farms' performance, leaving policy makers (in the EU and beyond) with a limited systematic evidence base at meso-territorial level to inform their choices in this area. Finally, the identification of GIs as local institutions that are recognized worldwide has not been addressed. However, the identification of institution proxies at the local level is critical for the analysis of local development determinants; a consensus has not yet been reached, especially in relation to 'informal' institutions (Charron et al., 2014; Frericks et al., 2018; Rodríguez-Pose & Garcilazo, 2015; Tabellini, 2010; Williamson, 2009).

In this context, the contribution of this paper can be summarized as follows: we study the linkages between GIs and local development by quantitatively analysing

the impacts associated with an entire sector of GIs (wine) in one of the countries where GIs are most important (Italy), using as units of observation single municipalities, that is, the territorial units to which wine GIs refer. We present GIs as a case of local informal institutions associated with spatially embedded production systems, which are therefore acknowledged within the globally recognized formal institution of the GI scheme. Hence, we test the hypothesis that areas capable of developing space-sensitive models of production, which are actively endorsed by a formal institutional regime, eventually experience better performance in terms of local economic development than other areas.

Operationally, we use propensity score matching (PSM) and difference-in-differences (DiD) models to compare the population and employment dynamics of Italian rural municipalities entitled with *Denominazione di Origine Controllata e Garantita* (DOCG) status with the correspondent dynamics experienced by a counterfactual group of similar municipalities. Such analysis leverages a novel dataset that we constructed ad hoc starting from the individual codes of practice of Italian GIs.² The dataset covers the complete temporal and spatial extent of all Italian GIs at the year-municipality level.

Our findings show that GIs play a propulsive role for the local development of rural areas: in Italy, all else equal, rural municipalities with space-sensitive production acknowledged by GIs experience better local economic development trends over the 1951–2011 period. They attract more residents and shift the local economy toward higher value-added sectors.

REGULATORY FRAMEWORK AND EXISTING LITERATURE

Originating in Mediterranean Europe, GIs have been experiencing a massive increase in demand all over the world. The acknowledgement of a GI affords a product some level of protection against conflictual uses and piracy (European Union Intellectual Property Office (EUIPO), 2017). In this sense, GIs work as collective property rights: they can be compared to a perpetual patent owned by all the producers of the demarcated region whose products comply with the specification outlined in the code of practice. The appellation of origin is owned by the collective of producers, but each of them can exercise that right independently from one another. GIs protect the investments made by producers and traders, and they also offer consumer protections by certifying the unique qualities that characterize a product (Raimondi et al., 2019).

At the world level, more than 200 bilateral and multi-lateral World Intellectual Property Organization (WIPO) and World Trade Organization (WTO) agreements exist defining GI regulations.³ In 2007, Colombian coffee was the first non-EU product granted GI status in the EU.

At the EU level, GIs aim to preserve and enhance the importance of the origin of a product, recognizing it as distinct from the standardized and space-blind production context within which the majority of agri-food goods are

produced. They certify products that are associated with a specific region of origin and with traditional production techniques codified by a common code of practice (European Commission, 2019). They convey their geographical, historical and cultural origin and are, therefore, not reproducible outside of this space-bounded context. EU regulations clearly state that 'operating quality schemes for producers can benefit the rural economy, particularly the case in areas where the farming sector accounts for a significant part of the economy and production costs are high' (European Parliament and Council, 2012, §4). Moreover, GIs are designed to compensate for the structural weaknesses that farmers, agri-food sectors and rural territories face in successfully participating in the globalized economy (Bojnec & Ferto, 2015).

Some of the channels through which GIs can trigger and maintain positive economic outcomes have been investigated in different streams of literature, and the European Commission itself has financed a series of research projects to investigate further the possible strengths and weaknesses of GIs.

Some studies have highlighted how GIs concern not only the biophysical and natural characteristics of particular products, but also offer protection to the socio-economic and institutional environment underpinning the production process (WTO, 1994). Other studies have focused on their link with the French notion of *terroir* (Cross et al., 2011; Josling, 2006), which is defined as a delimited geographical space where a collective tacit know-how has been constructed over the years as a culmination of informal interactions between natural and human factors.⁴ The cross-fertilization of these elements creates a proactive framework that codifies the features and enhances the reputation of products originating in the demarcated area, allowing producers to employ differentiation strategies (Altomonte et al., 2016).

A different strand of studies investigates the main conditions favouring producers in their efforts to have their products institutionally acknowledged with GIs. Huysmans and Swinnen (2019) investigate the determinants behind the presence of GIs, especially in Southern Europe, and conclude that the concentration of GIs found in the region is not merely the consequence of natural and climatic conditions. Instead, they emphasize the significance of socio-economic determinants and the role played by political factors, such as international trade agreements and institutional spillovers. Meloni and Swinnen (2018) highlight the role of a favourable institutional context, with the existence of formal agreements, a certain political power, strong entrepreneurship and a good infrastructure endowment; as well as consumer demand. Vaquero-Piñero (2021) tests these linkages in the case of Italy at the municipality level, showing that successful GIs are positively correlated with favourable ex-ante development conditions in terms of local development and the dynamism of a municipality's agri-food sector. Charters and Spielmann (2014) advocate for the key role of local actors' engagement and cooperation, which has been confirmed by Wilkinson et al. (2017) in their analysis of GIs in Brazil.

Studies focusing on the ex-post impacts of GIs found positive effects on premium pricing (Huysmans & Swinnen, 2019), market access (Altomonte et al., 2016; Bouet et al., 2017), value distribution (Belletti & Marescotti, 2017), land rents (Cross et al., 2011), and socio-economic and environmental sustainability (Belletti et al., 2015). Moschini et al. (2008) claim that the main beneficiaries of GIs are consumers, because they solve an information asymmetry. A 2018 study conducted by the UN's Food and Agriculture Organization (FAO) observes some positive local externalities in promoting innovation.

A final group of papers investigates the role of GIs in supporting socio-economic development (see Torok et al., 2020, for a review). The majority of these contributions focus on specific case studies and adopt qualitative approaches (e.g., Belletti et al., 2015; Bowen, 2010), such as interviews, desk research and figure comparisons (Bowen & Zapata, 2009; Dogan & Gokovali, 2012; Tregear et al., 2007). For instance, Gerz and Dupont (2006), analyzing the case of Comté cheese in France, show that this GI has generated benefits to rural areas at both micro (added value to producers) and regional levels (employment and job quality and attracting tourists to Franche-Comté area). Lourenco-Gomes et al. (2015) investigate the role of landscapes for visitors by focusing on the Alto Douro wine region in Portugal, while Ferretti and Gandino (2018) select an Italian wine region, Langhe and Roero, to investigate the efficiency of a community-based strategy of rural regeneration. Other studies are more systematic (e.g., Carbone et al., 2014) and focus on all the different actors involved along the supply chain (Kizos & Vakoufari, 2011). Cei et al. (2018) provide a first assessment of impact of food GIs in Italy at the NUTS-3 level, with a sector-oriented approach focused on agricultural added value. The evidence on local economic development effects from a quantitative perspective is therefore still limited (Dias & Mendes, 2018; FAO, 2018).

The contribution of our paper particularly addresses this latter stream of studies, focused on GIs' linkages with local development. By means of a quantitative counterfactual analysis, this paper corroborates the predominant anecdotal evidence produced so far, with the hypothesis that the global acknowledgments to the informal institutions emerging at the local level in association with spatially embedded production systems play a positive role for economic development.

GI WINES IN ITALY

Italy is an excellent case study for high-quality agri-food products: the intrinsic relation between Italian agri-food products and their regions of origin is so internationally recognized that the country is one of only a few in Europe with agricultural territories designated as United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites. Moreover, as of 2019, Italy is the European country with the highest number of GI designations: 299 foods and 526 wines; the total

agri-food GI turnover being around €16 billion, with €3.5 billion from the wine sector (Qualivita, 2019).

The Italian leading and historical role in GIs is particularly rooted in the wine sector. In Italy, wine production has a long and well-defined tradition, more than any other agri-food production, since viticulture existed even before Roman times, and thereafter almost everywhere in the country. Together with France, which established the term *appellation d'origine contrôlée* (AOC) as early as 1935, the Italian laws to protect its quality wines contributed to building the regulatory basis of the overall system of EU GIs, established in the 1960s, within the Common Agricultural Policy (CAP) (EEC, 1992).⁵

In 2019, Italian GI wines represented 35% of total GI wines in Europe (Qualivita, 2019).

All Italian regions, moreover, produce wine. The capillary spatial distribution of Italian high-quality wine reflects the differentiation and segmentation of the entire industry, as a direct consequence of its history. The coexistence of various forms of management, from family farms to multinational producers, and the considerable differences in terms of utilized agricultural area (UAA), are evocative of the Italian scenario. Even though technical progress has transformed production processes towards more standardized and mechanized ones, unique know-how and tacit knowledge have allowed these high-quality wines to remain anchored to typical and historical traditions (Morrison & Rabellotti, 2017).

Italy is the only country in Europe to have two categories of wine certification under the Protected Designation of Origin (PDO) GI scheme (L.238/2016): in addition to *Denominazione di Origine Controllata* (DOC) certification, the *Denominazione di Origine Controllata e Garantita* (DOCG) certification is acknowledged only for the highest quality wines for which producers have to follow stricter rules (Corsi et al., 2019).

In 2011, around 52% of Italian municipalities were acknowledged to produce at least one PDO GI wine. Among them, 12% of Italian municipalities were producing DOCG wines, with a spatial distribution involving the majority of Italian regions (Figure 1).

RESEARCH DESIGN AND EMPIRICAL SETTING

This paper studies the effects of GIs on the local development of Italian rural areas by adopting counterfactual techniques intended at isolating the causal effects of GIs on local development from other confounding factors simultaneously correlated with both the assignment of a GI and economic performance.

The analysis is developed at the municipality level, which is the most disaggregated level used to date by the existing studies on GIs. It is also the only appropriate level of analysis, given the rules of assignment of GIs: the so-called region of origin refers to an area of specific neighbouring municipalities, which is significantly smaller and distinct in comparison with provinces or regions.

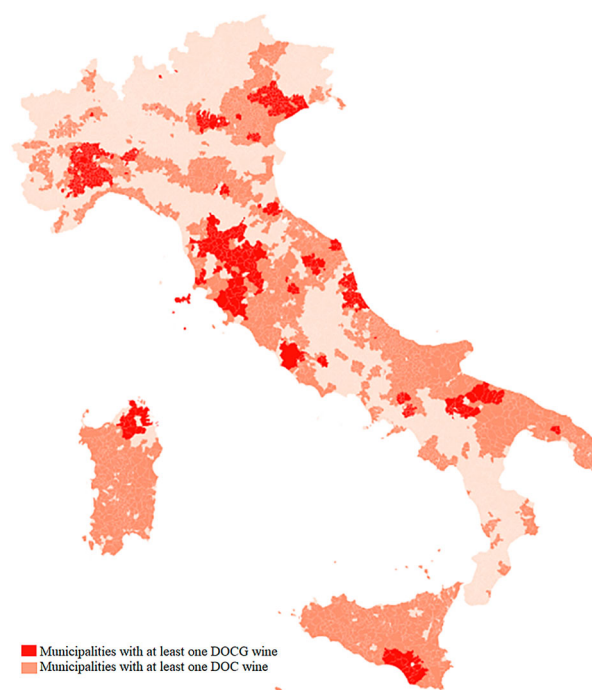


Figure 1. *Denominazione di Origine Controllata* (DOC) and *Denominazione di Origine Controllata e Garantita* (DOCG) municipalities in Italy, 2011.

Source: Authors' elaboration on data collected from Geographical Indication (GI) codes of practice.

Two groups of municipalities are identified, based on whether or not they are registered under DOCG. For DOCG municipalities we distinguish a pre- and post-treatment period identified based on the first year of designation. The pre-treatment period refers to those years with no certification at all, while the post-treatment period represents the years during which municipalities are under the GI designation.

The analysis covers the longest period possible, ranging from the census of 1951 to the last available census of 2011.

We restricted the sample to municipalities that are rural (classification of the National Rural Network),⁶ not entirely devoted to tourism (according to the classification by the National Tourism Observatory)⁷ and with a positive level of viticulture (< 0 ha). This allows us to exploit the variation in the remaining 70% of Italian municipalities (Figure 2), while reducing the risk of introducing confounding factors that might affect their development patterns, but which are disconnected from agricultural production.⁸

Even though the focus is on DOCG wines, we also reconstructed data on all the other wine and food GIs certified in each municipality-year, including the information in our analysis. The scope is to control for the different market and political powers that can discriminate the capacity of municipalities to be newly acknowledged or not with DOCG status.

As far as dependent variables are concerned, our measures of local development in rural areas refer to the

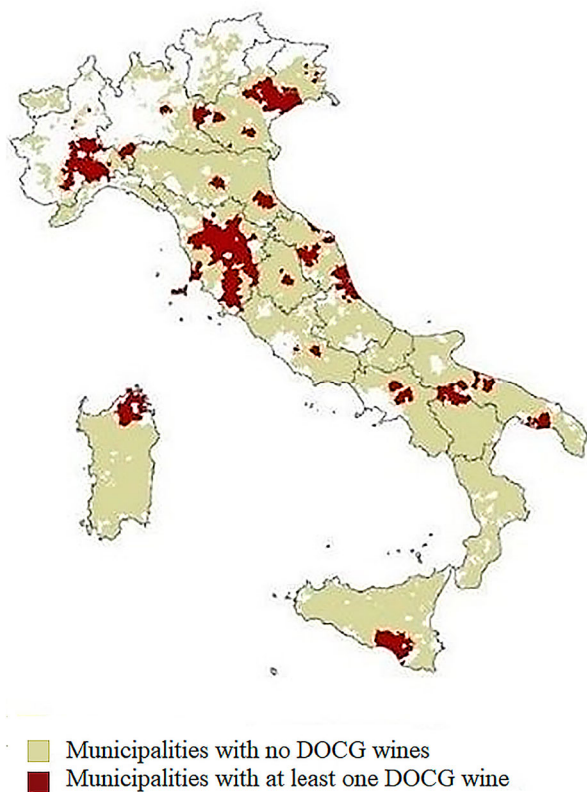


Figure 2. In-sample *Denominazione di Origine Controllata e Garantita* (DOCG) municipalities, 2011.

Source: Authors' elaboration on data collected from Geographical Indication (GI) codes of practice.

growth rates of population and to the change in composition of the employment structure between farm and non-farm sectors.

Changes in population and in economic structures are commonly employed as indicators of growth and development processes of rural areas (Carlino & Mills, 1987; Chen & Partridge, 2013; Olfert et al., 2014). The phenomenon of 'ghost villages' in mountain and internal areas, such as in Apennine Central Italy, is tackled by specific policies devoted to slowing demographic decline through place-sensitive and bottom-up approaches (e.g., Aree Interne). A consolidated literature has shown how demographic decline involves territories with strong historical-cultural identity, distinctive agri-food products, landscapes and natural resources of great value (Biagi et al., 2011; Bonifazi et al., 2020).

The other two dependent variables relate to the transition of the rural economies towards higher value-added sectors. In particular, they capture changes in the shares of farm and non-farm employment. Our analysis is therefore focused on changes in employment composition, and not in employment dimensions (we do not have data on employment levels, only on employment shares). By guaranteeing a relevant international visibility to the entire regions of origin, GIs promote a diversification of regional development patterns that can generate new employment opportunities (Gerz & Dupont, 2006). Especially in cases when the entire production process

needs to be located in the GIs area, non-farming activities related to GIs can support rural communities' well-being and local development as a whole by reinforcing pluri-activity (Gerz & Dupont, 2006) and broadening diversification strategies (Tregear et al., 2016). Among the activities linked to the whole chain of GIs, those of the agricultural sector are most likely to benefit directly from development processes, though they are not the only ones (Vandecandelaere et al., 2009). In particular, a positive linkage between tourism activities and GI wines has been identified by Santeramo et al. (2017) and Di Bella et al. (2019) in the case of the Etna region in Sicily.

MODELS AND ESTIMATION ISSUES

To identify the causal effect of GIs, we need to control for those elements that might have driven the acknowledgment of the DOCG status (e.g., the strength of local actors and institutions). In other words, we need to make sure that our analysis rules out any significant difference between DOCG and non-DOCG municipalities in terms of these characteristics. In order to achieve this aim, we make use of PSM-DiD models.

First, a nearest-neighbours PSM model uses a set of observable contextual socio-economic and topography characteristics to exclude from the sample all those municipalities that are non-comparable with any treated ones.⁹ After the application of the PSM the differences in terms of observables between DOCG (817) and control (3870) municipalities are almost all not statistically significant (see Table A2 in Appendix A in the supplemental data online). The contribution of the PSM in creating the 'as good as random' scenario is confirmed by the PSM graphs showing treated and untreated distributions before and after the PSM application (see Figure A1 in Appendix A online).

On the sample identified by the PSM, we apply DiD models, capable of controlling for any time-invariant difference between the treated and the control groups as well as for any time-variant aspect varying similarly across them. Model (1) follows the standard two-periods (pre and post) specification (Bertrand et al., 2004), whereas the same model set up to exploit the multi-years panel structure is presented in the robustness check section.¹⁰

$$\begin{aligned} \Delta Local\ Development_{it} = & \alpha + \beta_1 DOCG_{it} + \beta_2 Post_{it} \\ & + \beta_3 (Post_{it} * DOCG_{it}) \\ & + CONTROLS_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where i is the municipality; and t is the census year of reference.¹¹ $\Delta Local\ Development$ is measured by means of three dependent variables: the growth rate of population (1), the growth rate of the share of people working in farm sectors (2), and the growth rate of the share of people working in non-farm (3) sectors.¹² Since censuses are replicated every 10 years, the dependent variables are

measured as 10-year growth rates and capture the impact of the GIs in the long run over the period 1951–2011. We consider municipalities for which we can observe at least 10 years of both pre- and post-treatment.

DOCG is a dummy variable that takes the value of 1 if the municipality i has been acknowledged the status of DOCG; $Post$ is a dummy taking the value of 1 for the post-treatment period;¹³ and $Post*DOCG$ is the interaction of the two variables.

The baseline model also includes the regional dummies, the pre-treatment trends in the outcomes¹⁴ and three covariates remaining unbalanced in the sample identified by the PSM. The model is then augmented with a control matrix including the number of total GIs produced in each municipality and a series of variables capturing other relevant aspects of the GIs status (see Table A3 in Appendix A in the supplemental data online).¹⁵ Finally, spatial lags accounting for the presence of DOCGs in neighbouring municipalities are also included (Lobianco & Esposti, 2010).

RESULTS

Results from model (1) are presented in Table 1.¹⁶ According to our findings, the institutional endorsement of the local embedded production exercised via GIs positively affects local development in rural municipalities. The first positive effect is found in the case of population growth rate (Table 1, panel A). The coefficient of treatment effect is significant and positive since the first specification (1). Its sign and significance do not change in the extended specifications in columns (2) and (3), including all controls, while the magnitude of the effect increases. The finding is particularly relevant given that the majority of Italian GIs are produced in rural areas; and that Italian rural areas, on average, have been characterized by population decline (European Observation Network for Territorial Development and Cohesion (ESPON), 2017). Local community-based idiosyncrasies are a fundamental part of the local embeddedness that characterizes GIs' intangible added value. In this sense, given that GIs cannot be relocated outside of their official production

Table 1. Effects of *Denominazione di Origine Controllata e Garantita* (DOCG) on local development.

	(1)	(2)	(3)
<i>(A) Population</i>			
DOCG	0.050*** (0.007)	0.056*** (0.007)	0.062*** (0.009)
Observations	7593	7593	8085
R^2	0.441	0.451	0.452
<i>(B) Share of farm employment</i>			
DOCG	-0.078*** (0.017)	-0.086*** (0.019)	-0.099*** (0.019)
Observations	8083	8083	8083
R^2	0.307	0.320	0.341
<i>(C) Share of non-farm employment</i>			
DOCG	0.071*** (0.015)	0.094*** (0.016)	0.079*** (0.016)
Observations	8085	8085	8085
R^2	0.474	0.476	0.473
Regional dummies	Yes	Yes	Yes
Pre-trends	Yes	Yes	Yes
Unbalanced covariates	Yes	Yes	Yes
Controls		Yes	Yes
Spatial lags			Yes

Notes: Pre-trends include: pre-treatment population growth rate, pre-treatment share of farm employment growth rate, pre-treatment share of non-farm employment growth rate.

Unbalanced covariates include: a municipality-year-varying variable accounting for the elderly rate; a municipality-year-varying variable accounting for the distance from major cities; and a municipality-year-varying variable on the rurality classification.

Controls include: a municipality-year-varying variable accounting for the total number of acknowledged Geographical Indications (GIs); a $t - 1$ level of population/farm employment/non-farm employment; a municipality-year-varying dummy accounting for the presence of DOCG sparkling wine; a municipality-year-varying dummy accounting for the presence of DOCG monovarietal wines; a municipality-varying dummy classifying municipalities belonging to United Nations Educational, Scientific and Cultural Organization (UNESCO) area; municipality-varying dummies accounting for the years of certification; and a municipality-year-varying dummy accounting for the presence of one of the most successful Italian GIs as classified by the official national ranking provided by the 2019 annual report of the ISMEA-Qualivita (Qualivita, 2019).

Clustered standard errors are shown in parentheses (municipalities).

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; outcome variables are expressed as 10-year growth rates.

areas, the positive dynamic that they activate may encourage people to live and work in their place of origin, thus enhancing rural economies at a local level by supporting their adaptive capacity to socio-economic and environmental crisis. With regard to employment structure, after being recognized via a DOCG, the share of people working in farming in these areas seems to decrease more than in non-DOCG rural areas, while the share of people working in non-farm sectors seems to increase more. In the case of the share of farm employment, coefficients are indeed significant and negative in all the models' specifications (Table 1, panel B). By contrast, coefficients for the share of non-farming employment are significant and positive (Table 1, panel C). In other words, GI certification seems to promote an inter-sectoral reorganization of rural economies towards higher value-added economic sectors. The dynamics of the share of farming and non-farming employment are of course linked together. The role of GIs in triggering a reorganization of the economic structure of rural areas towards more advanced sectors involves those sectors that are mostly associated with the whole chain of the GIs. In this sense, tourism (e.g., agritourism and restaurants) might be one sector driving the shift of rural economies towards a more advanced structure.

Data on employment by economic activities – which are not used in the main analysis since they are available only for the 1971–2011 period – confirm that the sectors where the share of employment of DOCG municipalities grow the most are Accommodation and food service and Financial, professional, scientific technical and entrepreneurship activities (Figure 3).¹⁷ This finding should encourage a careful reflection on the importance of triggering non-farming activities. Indeed, even if consumers' demand and future market orientation changed, the

non-farming activities generated by GIs' intersectoral spillovers would continue to support local economies. In this way, GIs can trigger a virtuous circle mainly driven by non-farming activities.

In sum, Italian rural municipalities included in DOCG areas, and therefore within the EU's GI regime, show – *ceteris paribus* – higher growth rates for population and experience a deeper reorganization of local economy and employment structures towards more advanced sectors than municipalities not included in DOCG areas.

GI EFFECTS IN HETEROGENEOUS SCENARIOS

The effects generated by GIs in terms of local development can be mediated by different contextual conditions and can be activated through different mechanisms (Torok et al., 2020). In what follows we test a set of heterogeneity dimensions of the GIs' effects related to territorial and GI characteristics.

The consolidated evidence in the literature demonstrates that institutional quality plays a crucial role for GIs (Meloni & Swinnen, 2018). We recognize that the overall institutional architecture needs to work properly in order that our informal institutions associated with the spatially embedded productions, and therefore recognized within the scheme, result in local development. Therefore, we test if GIs' impacts on local development change according to different levels of institutional quality. With this aim, we created two subsamples of municipalities according to the level of the European quality of government index (EQI) of the region to which they belong.¹⁸ As expected, the effects of GIs are sharper when regional institutions are better (see Table A6 in Appendix A in the

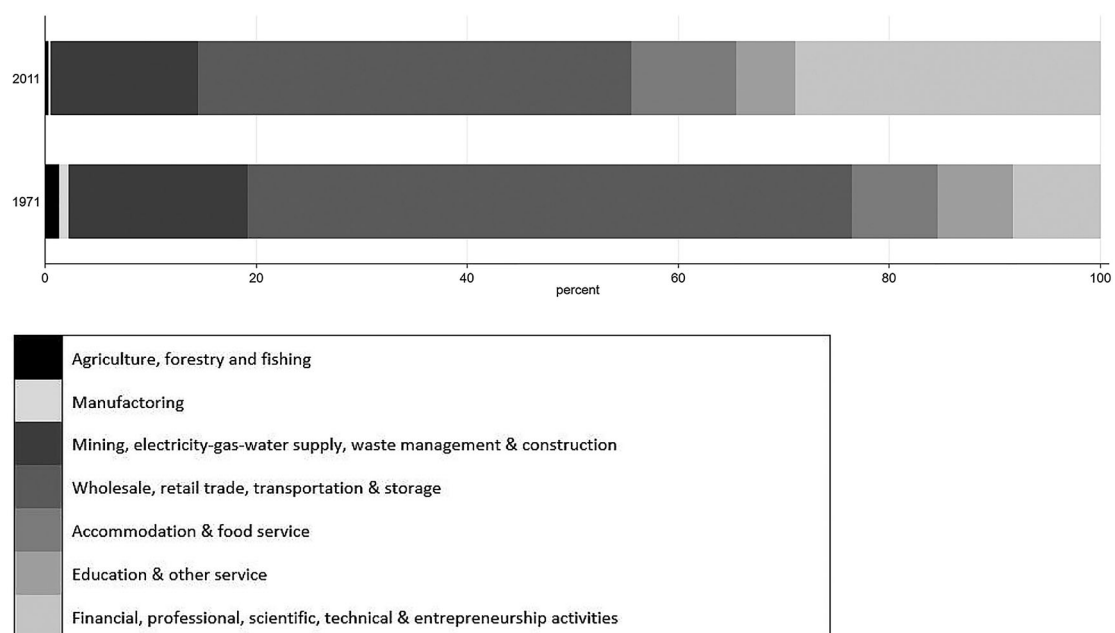


Figure 3. Employment level in *Denominazione di Origine Controllata e Garantita* (DOCG) municipalities by Statistical Classification of Economic Activities in the European Community (NACE) classification, 1971–2011.

Source: Authors' elaboration on 1971 and 2011 Istituto Nazionale di Statistica (ISTAT) National Census data.

supplemental data online). In particular, the role of GIs for the transformation of the economy towards a composition more in favour of higher value-added sectors becomes insignificant for those regions where the institutional quality is lower. In order for GIs to activate fruitfully the mechanisms of change, the overall architecture of institutions needs to be supportive.

Among the drivers of economic development, the quality of institutions is also confirmed to be crucial for the GIs' impacts. By contrast, the latter become neutral to weaknesses/strengths along other local development dimensions: by using the classification proposed by the European Commission for Cohesion Policy, according to which regions are classified into 'more' or 'less' developed, we investigated whether the effect of GIs changes in the two groups of municipalities, which did not unveil any significant difference (see Table A7 in Appendix A in the supplemental data online).

By shifting the focus on the impact's heterogeneity specifically related to GIs characteristics, we investigate the potential heterogeneity of effects generated according to the co-involvement, within a specific GIs area, of a higher number of municipalities. The aim is to capture the presence of a complementary effect generated by agglomeration and economies of scale. In fact, 25% of Italian DOCGs are produced in only three municipalities or fewer. Table A8 in Appendix A in the supplemental data online shows the results of model (1) augmented with an interaction between the DOCG variable and a dummy variable where the value is 1 for DOCGs produced within an area composed of a maximum of three municipalities. The DOCG impact is confirmed to be neutral to the number of municipalities involved in the GI areas in terms of population and farm employment. The positive impact

of GIs is confirmed also when increasing the share of non-farm employment, and in this case GI areas with a larger number of involved municipalities are even more favoured. GIs also remain a viable rural development tool for smaller (and possibly more remote) areas where economies of scale are more difficult to achieve. In addition, GIs are impactful without implying severe transaction costs that are often associated with co-shared structures of governance (Penker & Klemen, 2010).

Lastly, we investigate whether the role of GIs changes for different market structures of the GI products. Specifically, we are interested in GI wines sold in quasi-monopolistic markets. With this aim, we look at GI sparkling wines. By interacting the DOCG dummy with a dummy flagging municipalities with a sparkling wines DOCG, we tested whether the effect of GIs is larger or smaller for those municipalities where the DOCG refers to a sparkling wine (see Table A9 in Appendix A in the supplemental data online). Significant coefficients for the interacted variable are estimated for the two outcomes related to the composition of employment, suggesting that the effect of GIs is larger when the certification is attributed to wines sold in non-perfect competition markets, characterized by a low number of competitors and with significant barriers to entry. GIs are confirmed to be crucial for the translation of spatially embedded productions into local development, especially in the presence of non-perfect competition markets.

ROBUSTNESS CHECKS

In this section we present some empirical extensions aimed at corroborating the robustness of the results presented so far.

Table 2. Placebo test.

	Population	Farm employment	Non-farm employment
DOCG – 10 years before	–0.004 (0.008)	0.018 (0.013)	–0.017 (0.025)
Regional dummies	Yes	Yes	Yes
Pre-trends	Yes	Yes	Yes
Unbalanced covariates	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Spatial lags	Yes	Yes	Yes
Observations	6087	6087	6087
R^2	0.279	0.246	0.463

Notes: Pre-trends include: pre-treatment population growth rate, pre-treatment share of farm employment growth rate, and pre-treatment share of non-farm employment growth rate.

Unbalanced covariates include: a municipality–year-varying variable accounting for the elderly rate; a municipality–year-varying variable accounting for the distance from major cities; and a municipality–year-varying variable on the rurality classification.

Controls include: a municipality–year-varying variable accounting for the total number of acknowledged Geographical Indications (GIs); a $t - 1$ level of population/farm employment/non-farm employment; a municipality–year-varying dummy accounting for the presence of *Denominazione di Origine Controllata e Garantita* (DOCG) sparkling wine; a municipality–year-varying dummy accounting for the presence of DOCG monovarietal wines; a municipality-varying dummy classifying municipalities belonging to United Nations Educational, Scientific and Cultural Organization (UNESCO) area; municipality-varying dummies accounting for the years of certification; and a municipality–year-varying dummy accounting for the presence of one of the most successful Italian GIs as classified by the official national ranking provided by the 2019 annual report of ISMEA-Qualivita (Qualivita, 2019).

Clustered standard errors are shown in parentheses (municipalities).

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; outcome variables are expressed as 10-year growth rates.

First, we run a placebo test standardly applied to DiD analyses: we simulate an anticipated (placebo) timing of DOCG certifications with the aim of observing a non-significant variation in the outcomes. If a significant difference between DOCG and non-DOCG municipalities can be observed even before the real treatment, the condition of random selection of the treatment is not verified. Hence, we test if this is the case by re-estimating the models by substituting our treatment variable with a new placebo variable that takes the value of 1 from 10 years before the real treatment. For instance, we simulate a treatment beginning in 1961 for those municipalities which are treated in 1971. Results show that all the coefficients estimated as such are not significant (Table 2).

Second, we re-estimated the DiD models by exploiting all the time variation available from 1951 to 2011: in this case, the model is estimated in a panel data setting of DiD where pre- and post-treatment periods are represented by multiple single years and not by two collapsed periods as in model (1), which is run according to the standard two-periods DiD (Bertrand et al., 2004). In the panel data DiD model, year and municipalities fixed effects are included in order to account for time and municipality-varying aspects; and region fixed effects are also interacted with the year dummies. Findings entirely confirm the significance, signs and magnitude of the main results obtained with the two-periods DiD (see Table A10 in Appendix A in the supplemental data online).

Finally, we replicated the models by retaining those municipalities that were removed from the sample because of their high touristic attractiveness,¹⁹ obtaining results in support to the baseline estimation (see Table A11 in Appendix A in the supplemental data online).

CONCLUSIONS

This paper has studied the effect of the GIs scheme on the local development of rural areas of Italy by focusing on wine GIs, for which Italy has a prominent role worldwide. We consider GIs as local institutions that emerge in association with locally embedded systems of productions and that are therefore recognized within a formal and internationally valid scheme. In this way, we have been able to investigate empirically whether territories characterized by local, embedded production, which have been endorsed by formal institutional designations, experience greater population growth and more marked patterns of sectorial restructuring as part of their local economic development trajectories.

Overall, our findings show that rural areas endorsing space-sensitive agri-food productions through GIs eventually experience better performance in terms of local economic development than others. The designation of a GI slowed population decline and fostered inter-sectoral development processes. These inter-sectoral effects determine the diversification of the whole local economy, with a shift from agricultural specialization towards higher value-added sectors.

Our results suggest that GIs represent a relevant policy tool for both less and more developed regions. They can promote positive changes for rural areas even without implying any co-shared governance across municipalities. Their role is even more relevant for products sold in markets characterized by a small number of competitors and barriers of entry. However, the quality of the overall institutional architecture of regions where GIs are based remains a necessary condition for GIs to work.

On the one hand, our results shed light on the value of a global acknowledgment of the spatially embedded productions associated with informal, cultural and community-based specificities for the local development of rural areas. On the other hand, this analysis confirms the relevance of institutions for local development, which are still too often neglected in policy design and implementation. Local producers band together into groups (e.g., consortia), but their interactions therefore need to be enabled by EU rules and accompanied by an architecture of regional institutions of quality.

More generally, in evaluating the impact of GIs, our analysis can contribute to the ongoing policy debate on the effectiveness of space-sensitive policies in comparison with spatially blind interventions (Crescenzi & Giua, 2016; Farole et al., 2011; Varga, 2017). In light of post-2020 EU strategies, Cohesion Policy and Common Agricultural Policy (CAP) plans exhibit an increasing emphasis on place-sensitive policies to support local development, especially with regard to rural and inner areas (Crescenzi & De Filippis, 2017; Henke et al., 2018). The necessity for tailored interventions that respond more closely to the needs of citizens has been strongly emphasized in the Cohesion Policy framework. At the same time, CAP stresses the importance of improving life in rural areas by ensuring high-quality food and promoting local jobs and growth (Crescenzi et al., 2015). Indeed, even with changing consumer demand and the uncertainty of future market orientations, the GIs' intersectoral spillovers we identified may effectively contribute to support local economies.

This paper offers the first empirical contribution to investigate the impact of wine GIs at municipality level for an entire country, by evaluating quantitatively what would have happened without the global acknowledgment of space-sensitive wine production associated with local institutions. Unfortunately, data availability constraints have prevented the paper from investigating the mechanisms underlying the observed process of structural change in rural areas and fully offsetting the role of unobserved factors that vary at the municipality-year level for GI vis-à-vis non-GI areas.

Verifying the linkages explored by this study in other European countries will be important in order to generalize policy implications with respect to the EU policy agenda. Another important task is to use a more nuanced index of local development capable of capturing its multi-dimensional nature (local openness, international trade or sustainability performance). These key issues remain in our future research plans.

ACKNOWLEDGEMENTS

All errors and omissions are the authors' own.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

FUNDING

This research has received funding from the European Union's Horizon 2020 Research and Innovation Programme H2020 project BATModel [grant agreement number 861932] and the European Research Council [grant agreement number 639633-MASSIVE-ERC-2014-STG].

NOTES

1. European Parliament and Council (2012, Art. 5): 'Designation of origin is a name which identifies a product: (a) originating in a specific place, region or, in exceptional cases, a country; (b) whose quality or characteristics are essentially or exclusively due to a particular geographical environment with its inherent natural and human factors; and (c) the production steps of which all take place in the defined geographical area'. Source: <https://eur-lex.europa.eu/legal-content/IT/ALL/?uri=celex:32012R1151>
2. Source: eAmbrosia website, European Commission. <https://ec.europa.eu/info/food-farming-fisheries/food-safety-and-quality/certification/quality-labels/geographical-indications-register/>
3. In particular, the WTO TRIPS Agreements (1994), the WIPO Madrid Protocol (1983a), the WIPO Lisbon Agreement on Appellations of Origin and their International Registration (1983b), the WIPO Geneva Act of the Lisbon Agreement on Appellations of Origin and Geographical Indications (2015). In addition, the enforcement of GIs is carried out thanks to bilateral agreements between the EU and trading partners, such as South Korea, Japan and the Comprehensive Economic and Trade Agreement (CETA).
4. A *terroir* is an area in which collective knowledge of the interactions between the identifiable physical and biological environment and applied vitivinicultural practices develops, providing distinctive characteristics for the products originating from this area (Resolution OIV/Viti 333/2010 OIV).
5. Among the first GIs in Europe, there are 'Champagne' wine in France and the 'Vernaccia di San Gimignano', 'Brunello di Montalcino', 'Nobile di Montepulciano' and 'Pitigliano' wines in Italy.
6. The National Rural Network grouped municipalities into four clusters: urban, rural with specialized and intensive agriculture, transitional rural, and rural with economic structural weaknesses. The classification differs from the OECD and European Commission classification since

'rural status' is defined by a larger set of selecting criteria, rather than by only population density (Dijkstra & Poelman, 2014).

7. The touristic attractiveness index represents the number of beds in touristic accommodation per inhabitant, according to the *Osservatorio Nazionale del Turismo*'s definition. Threshold has been fixed at 0.5, and 951 municipalities have been excluded.

8. For example, the role of GIs in the Amalfi Coast area is conditioned by the touristic attraction of the area, rather than being representative of the average role that GIs might play for rural economies that revolve around agriculture.

9. We implement k -nearest neighbours matching ($k = 10$) one to one without replacement to adjust for the pre-treatment observable differences between a group of treated and a group of untreated municipalities. The estimation procedure and the variables used for the matching are described in detail in Table A1 in Appendix A in the supplemental data online. The source of the data is mainly Istituto Nazionale di Statistica (ISTAT), plus remote-sensing computations (Henderson et al., 2012). For descriptive statistics, see Table A4 online.

10. The DiD model follows the pre-/post-period specification proposed by Bertrand et al. (2004). As far as control observations, we ensure that their distribution follows the temporal distribution of the treatment. Collapsing data regarding both treated and non-treated observations into pre-/post-periods, rather maintaining the multi-year panel structure, produce consistent standard errors and avoid serial correlations (Bertrand et al., 2004).

11. Census data are available every 10 years, from 1951 to 2011.

12. More precisely, the share of farm-employed people is computed as the percentage of the economically active population working in the agriculture, forestry and fishing sectors; the share of non-farm employed people is computed as the percentage of the economically active population working in tradable, non-tradable sectors and services.

13. Since 2012, the DOC and DOCG certifications have been unified under a unique category. We backdate the advent of DOCG to the year when that wine had been recognized as DOC.

14. Outcomes variables data are available since 1951, which is the first year of our sample. Pre-treatment trends for the 1951 are computed by means of interpolation based on the entire time series (1951–2011). Therefore, we use aggregated data of the 1936 Census (available only in a non-readable pdf format and for aggregated jurisdictions) to validate the interpolations. For descriptive statistics, see Table A4 in Appendix A in the supplemental data online.

15. Controls include: a municipality-year-varying variable accounting for the total number of acknowledged GIs; a $t - 1$ level of population/farm employment/non-farm employment; a municipality-year-varying dummy accounting for the presence of DOCG sparkling wine, a municipality-year-varying dummy accounting for the presence of DOCG monovarietal wines; a municipality-year-varying dummy classifying municipalities belonging to

UNESCO area; municipality-varying dummies accounting for the years of certification; a municipality-year-varying dummy accounting for the presence of one of the most successful Italian GIs as classified by the official national ranking provided by the 2019 annual report of ISMEA-Qualivita (Qualivita, 2019) (Parmigiano Reggiano PDO, Grana Padano PDO, Prosciutto di Parma PDO, Prosecco PDO, Mozzarella di Bufala Campana PDO, Gorgonzola PDO, Prosciutto di San Daniele PDO, Conegliano Valdobbiadene – Prosecco PDO and Pecorino Romano PDO; a total of 200 of our treated municipalities are included in these areas). For descriptive statistics, Table A4 in Appendix A in the supplemental data online.

16. Table A5 in Appendix A in the supplemental data online reports coefficients and standard errors for all control variables.

17. Data on employment by economic activities (Statistical Classification of Economic Activities in the European Community – NACE) are not available for 1951 and 1961 (i.e., the pre-treatment period for GIs granted in 1971). In consequence, we are forced to run our models on the (more aggregated) available variables.

18. We use data on the EQI, widely employed in the literature (Charron et al., 2014) but unfortunately available only at the NUTS-2 level and only since 2010. The EQI is based on four indicators: control of corruption; government effectiveness; rule of law; and voice and accountability, and it combines the four into one composite index (equal weighting).

19. See note 5.

ORCID

Riccardo Crescenzi  <http://orcid.org/0000-0003-0465-9796>

Mara Giua  <http://orcid.org/0000-0001-8923-437X>

Cristina Vaquero Pineiro  <https://orcid.org/0000-0002-1378-3361>

REFERENCES

- Altomonte, C., Colantone, I., & Pennings, E. (2016). Heterogeneous firms and asymmetric product differentiation. *The Journal of Industrial Economics*, 64(4), 835–874. <https://doi.org/10.1111/joie.12105>
- Belletti, G., & Marescotti, A. (2017). Geographical indications, public goods and sustainable development: The role of actors' strategies and public policies. *World Development*, 98, 45–57. <https://doi.org/10.1016/j.worlddev.2015.05.004>
- Belletti, G., Marescotti, A., Sanz-Cañada, J., & Vakoufari, H. (2015). Linking protection of geographical indications to the environment: Evidence from the European Union olive oil sector. *Land Use Policy*, 48, 94–106. <https://doi.org/10.1016/j.landusepol.2015.05.003>
- Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics*, 119(1), 249–275. <https://doi.org/10.1162/003355304772839588>
- Biagi, B., Faggian, A., & McCann, P. (2011). Long and short distance migration in Italy: The role of economic, social and environmental characteristics. *Spatial Economic Analysis*, 6(1), 111–131. <https://doi.org/10.1080/17421772.2010.540035>
- Bojnec, S., & Ferto, I. (2015). Agri-food export competitiveness in European Union countries. *JCMS: Journal of Common Market Studies*, 53(3), 476–492. <https://doi.org/10.1111/jcms.12215>
- Bonanno, A., Sekine, K., & Feuer, H. N. (Eds.). (2019). *Geographical indication and global agri-food: Development and democratization*. Routledge.
- Bonifazi, C., Heins, F., Licari, F., & Tucci, E. (2020). The regional dynamics of internal migration intensities in Italy. *Population Space Place*. <https://doi.org/10.1002/psp.2331>
- Bouet, A., Emlinger, C., & Lamani, V. (2017). What determines exports of luxury products? The case of cognac. *Journal of Wine Economics*, 12(1), 37–58. <https://doi.org/10.1017/jwe.2017.2>
- Bowen, S. (2010). Embedding local places in global spaces: Geographical indications as a territorial development strategy. *Rural Sociology*, 75(2), 209–243. <https://doi.org/10.1111/j.1549-0831.2009.00007.x>
- Bowen, S., & Zapata, A. V. (2009). Geographical indications, terroir, and socioeconomic and ecological sustainability: The case of tequila. *Journal of Rural Studies*, 25(1), 108–119. <https://doi.org/10.1016/j.jrurstud.2008.07.003>
- Capello, R. (2018). Cohesion policies and the creation of a European identity: The role of territorial identity. *JCMS: Journal of Common Market Studies*, 56(3), 489–503. <https://doi.org/10.1111/jcms.12611>
- Carbone, A., Caswell, J., Galli, F., & Sorrentino, A. (2014). The performance of protected designations of origin: An ex post multi-criteria assessment of the Italian cheese and olive oil sectors. *Journal of Agricultural & Food Industrial Organization*, 12(1), 121–140. <https://doi.org/10.1515/jafio-2013-0017>
- Carlino, G., & Mills, E. (1987). The determinants of county growth. *Journal of Regional Science*, 27(1), 39–54. <https://doi.org/10.1111/j.1467-9787.1987.tb01143.x>
- Cei, L., Stefani, G., Defrancesco, E., & Lombardi, G. V. (2018). Geographical indications: A first assessment of the impact on rural development in Italian NUTS3 regions. *Land Use Policy*, 75, 620–630. <https://doi.org/10.1016/j.landusepol.2018.01.023>
- Charron, N., Dijkstra, L., & Lapuente, V. (2014). Regional governance matters: Quality of government within European Union member states. *Regional Studies*, 48(1), 68–90. <https://doi.org/10.1080/00343404.2013.770141>
- Charters, S., & Spielmann, N. (2014). Characteristics of strong territorial brands: The case of champagne. *Journal of Business Research*, 67(7), 1461–1467. <https://doi.org/10.1016/j.jbusres.2013.07.020>
- Chen, A., & Partridge, M. (2013). When are cities engines of growth in China? Spread and backwash effects across the urban hierarchy. *Regional Studies*, 47(8), 1313–1331. <https://doi.org/10.1080/00343404.2011.589831>
- Corsi, A., Mazzarino, S., & Pomarici, E. (2019). The Italian wine industry. In U. A. Alonso, J. M. Cardebat, & A. Corsi (Eds.), *The Palgrave handbook of wine industry economics* (pp. 47–76). Palgrave Macmillan.
- Crescenzi, R., & De Filippis, F. (2017). Cohesion policy and rural development. In S. Piattoni & L. Polverari (Eds.), *Handbook on cohesion policy in the EU* (pp. 325–338). Edward Elgar.
- Crescenzi, R., De Filippis, F., & Pierangeli, F. (2015). In tandem for cohesion? Synergies and conflicts between regional and agricultural policies of the European Union. *Regional Studies*, 49(4), 681–704. <https://doi.org/10.1080/00343404.2014.946401>
- Crescenzi, R., & Giua, M. (2016). The EU Cohesion policy in context: Does a bottom-up approach work in all regions? *Environment and Planning A: Economy and Space*, 48(11), 2340–2357. <https://doi.org/10.1177/0308518X16658291>

- Cross, R., Plantinga, A., & Stavins, R. (2011). What is the value of terroir? *American Economic Review*, 101(3), 152–156. <https://doi.org/10.1257/aer.101.3.152>
- Daughbjerg, C. (2017). Responding to non-linear internationalisation of public policy: The world trade organization and reform of the CAP 1992–2013. *JCMS: Journal of Common Market Studies*, 55(3), 486–501. <https://doi.org/10.1111/jcms.12476>
- Di Bella, A., Petino, G., & Scrofani, L. (2019). The Etna macro-region between peripheralization and innovation: Towards a smart territorial system based on tourism. *Regional Science Policy & Practice*, 11(3), 493–507. <https://doi.org/10.1111/rsp3.12176>
- Dias, C., & Mendes, L. (2018). Protected designation of origin (PDO), protected geographical indication (PGI) and traditional speciality guaranteed (TSG): A bibliometric analysis. *Food Research International*, 103, 492–508. <https://doi.org/10.1016/j.foodres.2017.09.059>
- Dijkstra, L., & Poelman, H. (2014). *A harmonized definition of cities and rural areas: The new degree of urbanisation* (European Commission Regional Working Paper No. 01/2014).
- Dogan, B., & Gokovali, U. (2012). Geographical indications: The aspects of rural development and marketing through the traditional products. *Procedia – Social and Behavioral Sciences*, 62, 761–765. <https://doi.org/10.1016/j.sbspro.2012.09.128>
- European Commission. (2019). *Regulation 2019/33 of 17 October 2018 supplementing Regulation (EU) No 1308/2013 of the European Parliament and of the Council as regards applications for protection of designations of origin, geographical indications and traditional terms in the wine sector, the objection procedure, restrictions of use, amendments to product specifications, cancellation of protection, and labelling and presentation*. https://eur-lex.europa.eu/eli/reg_del/2019/33/oj
- European Communities Council (EEC). (1992). *Regulation No 2081/1992 of 14 July 1992 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31992R2081>
- European Observation Network for Territorial Development and Cohesion (ESPON). (2017). *Shrinking rural regions in Europe. Towards smart and innovative approaches to regional development challenges in depopulating rural regions*.
- European Parliament and Council. (2012). *Regulation No 1151/2012 of 21 November 2012 on quality schemes for agricultural products and foodstuffs*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R1151>
- European Union Intellectual Property Office (EUIPO). (2017). *Protection and control of geographical indications for agricultural products in the EU member states*. EUIPO.
- Farole, T., Rodríguez-pose, A., & Storper, M. (2011). Cohesion policy in the European Union: Growth, geography, institutions. *JCMS: Journal of Common Market Studies*, 49(5), 1089–1111. <https://doi.org/10.1111/j.1468-5965.2010.02161.x>
- Ferretti, V., & Gandino, E. (2018). Co-designing the solution space for rural regeneration in a new World Heritage site: A choice experiments approach. *European Journal of Operational Research*, 268(3), 1077–1091. <https://doi.org/10.1016/j.ejor.2017.10.003>
- Food and Agriculture Organization (FAO). (2018). *Strengthening sustainable food systems through geographical indications*. FAO.
- Frericks, P., Höppner, J., & Och, R. (2018). The difficulty of measuring institutions: A methodological approach to the comparative analysis of institutions. *Social Indicators Research*, 137(3), 847–865. <https://doi.org/10.1007/s11205-017-1638-9>
- Gerz, A., & Dupont, F. (2006). Comté cheese in France: Impact of a geographical indication on rural development. *Origin-Based Products: Lessons for Pro-Poor Market Development*, 372, 75–87.
- Giuliani, E. (2007). The selective nature of knowledge networks in clusters: Evidence from the wine industry. *Journal of Economic Geography*, 7(2), 139–168. <https://doi.org/10.1093/jeg/lbl014>
- Henderson, J. V., Storeygard, A., & Weil, D. N. (2012). Measuring economic growth from outer space. *American Economic Review*, 102(2), 994–1028. <https://doi.org/10.1257/aer.102.2.994>
- Henke, R., Benos, T., De Filippis, F., Giua, M., Pierangeli, F., & Pupo D'Andrea, M. R. (2018). The new common agricultural policy: How do member states respond to flexibility? *JCMS: Journal of Common Market Studies*, 56(2), 403–419. <https://doi.org/10.1111/jcms.12607>
- Huysmans, M., & Swinnen, J. (2019). No terroir in the cold? A note on the geography of geographical indications. *Journal of Agricultural Economics*, 70(2), 550–559. <https://doi.org/10.1111/1477-9552.12328>
- Josling, T. (2006). The war on terroir: Geographical indications as a transatlantic trade conflict. *Journal of Agricultural Economics*, 57(3), 337–363. <https://doi.org/10.1111/j.1477-9552.2006.00075.x>
- Kizos, T., & Vakoufaris, H. (2011). Valorisation of a local asset: The case of olive oil on Lesbos Island, Greece. *Food Policy*, 36(5), 705–714. <https://doi.org/10.1016/j.foodpol.2011.06.005>
- Lobianco, A., & Esposti, R. (2010). The regional multi-agent simulator (RegMAS): An open-source spatially explicit model to assess the impact of agricultural policies. *Computers and Electronics in Agriculture*, 72(1), 14–26. <https://doi.org/10.1016/j.compag.2010.02.006>
- Lourenco-Gomes, L., Pinto, L. M. C., & Rebelo, J. (2015). Wine and cultural heritage. The experience of the Alto Douro Wine Region. *Wine Economics and Policy*, 4(2), 78–87. <https://doi.org/10.1016/j.wep.2015.09.001>
- Maghssudipour, A., Lazzaretto, L., & Capone, F. (2020). The role of multiple ties in knowledge networks: Complementarity in the Montefalco wine cluster. *Industrial Marketing Management*. <https://doi.org/10.1016/j.indmarman.2020.03.021>
- Meloni, M., & Swinnen, J. (2018). Trade and terroir. The political economy of the world's first geographical indications. *Food Policy*, 81, 1–20. <https://doi.org/10.1016/j.foodpol.2018.10.003>
- Morgan, K. (1997). The learning region: Institutions, innovation and regional renewal. *Regional Studies*, 31(5), 491–503. <https://doi.org/10.1080/00343409750132289>
- Morrison, A., & Rabelotti, R. (2017). Gradual catch up and enduring leadership in the global wine industry. *Research Policy*, 46(2), 417–430. <https://doi.org/10.1016/j.respol.2016.09.007>
- Moschini, G., Menapace, L., & Pick, D. (2008). Geographical indications and the competitive provision of quality in agricultural markets. *American Journal of Agricultural Economics*, 90(3), 794–812. <https://doi.org/10.1111/j.1467-8276.2008.01142.x>
- Organisation for Economic Co-operation and Development (OECD). (2016). *A new rural development paradigm for the 21st century*. OECD Publ.
- Olfert, M. R., Partridge, M. D., Berdegue, J., Escobal, J., Jara, B., & Modrego, F. (2014). Places for place-based policy. *Development Policy Review*, 32(1), 5–32. <https://doi.org/10.1111/dpr.12041>
- Penker, M., & Klemen, F. (2010). *Transaction costs and transaction benefits associated with the process of PGI/PDO registration in Austria*. Federal Reserve Bank of St. Louis.
- Qualivita. (2019). *Rapporto 2019 ISMEA-Qualivita*. Fondazione Qualivita.
- Raimondi, V., Falco, C., Curzi, D., & Olper, A. (2019). Trade effects of geographical indication policy: The EU case. *Journal of Agricultural Economics*, 71, 330–356. <https://doi.org/10.1111/1477-9552.12349>
- Rodríguez-Pose, A. (2020). Institutions and fortune of territories. *Regional Science Policy Practice*, 1–16. <https://doi.org/10.1111/rsp3.12277>

- Rodríguez-Pose, A., & Garcilazo, E. (2015). Quality of government and the returns of investment: Examining the impact of cohesion expenditure in European regions. *Regional Studies*, 49(8), 1274–1290. <https://doi.org/10.1080/00343404.2015.1007933>
- Santeramo, F. G., Seccia, A., & Nardone, G. (2017). The synergies of the Italian wine and tourism sectors. *Wine Economics and Policy*, 6(1), 71–74. <https://doi.org/10.1016/j.wep.2016.11.004>
- Tabellini, G. (2010). Culture and institutions: Economic development in the regions of Europe. *Journal of the European Economic Association*, 8(4), 677–716. <https://doi.org/10.1111/j.1542-4774.2010.tb00537.x>
- Torok, A., Jantyk, L., Maro, Z. M., & Moir, H. V. J. (2020). Understanding the real-world impact of geographical indications: A critical review of the empirical economic literature. *Sustainability*, 12(22), 9434. <https://doi.org/10.3390/su12229434>
- Tregear, A., Arfini, F., Belletti, G., & Marescotti, A. (2007). Regional foods and rural development: The role of product qualification. *Journal of Rural Studies*, 23(1), 12–22. <https://doi.org/10.1016/j.jrurstud.2006.09.010>
- Tregear, A., Torok, A., & Gorton, M. (2016). Geographical indications and upgrading of small-scale producers in global agro-food chains: A case study of the mako onion protected designation of origin. *Environment and Planning A: Economy and Space*, 48(2), 433–451. <https://doi.org/10.1177/0308518X15607467>
- Vandecandelaere, E., Arfini, F., Belletti, G., & Marescotti, A. (2009). *Linking people, places and products*. FAO/SINERGI.
- Vaquero-Piñero, C. (2021). The long-term fortunes of territories as a route for agri-food policies: Evidence from geographical indications. *Bio-Based and Applied Economics*. <https://doi.org/10.13128/bae-9429>
- Varga, A. (2017). Place-based, spatially blind, or both? Challenges in estimating the impacts of modern development policies: The case of the GMR policy impact modelling approach. *International Regional Science Review*, 40(1), 12–37. <https://doi.org/10.1177/0160017615571587>
- Wilkinson, J., Cerdan, C., & Dorigon, C. (2017). Geographical indications and “origin” products in Brazil—The interplay of institutions and networks. *World Development*, 98, 82–92. <https://doi.org/10.1016/j.worlddev.2015.05.003>
- Williamson, C. (2009). Informal institutions rule: Institutional arrangements and economic performance. *Public Choice*, 139(3/4), 371–387. <https://doi.org/10.1007/s11127-009-9399-x>
- World Intellectual Property Organization (WIPO)-Administered Treaties. (1983a). *Madrid Agreement concerning the international registration of marks (as amended on September 28, 1979)* (Official translation) (TRT/MADRID-GP/001). <https://wipolex.wipo.int/en/treaties/textdetails/12599>
- World Intellectual Property Organization (WIPO)-Administered Treaties. (1983b). *Lisbon Agreement for the Protection of Appellations of Origin and their international registration (as amended on September 28, 1979)* (Official translation) (TRT/LISBON/001). <https://wipolex.wipo.int/en/treaties/textdetails/12586>
- World Intellectual Property Organization (WIPO). (2015). *WIPO Geneva Act of the Lisbon Agreement on Appellations of Origin and Geographical Indications*. WIPO. <https://www.wipo.int/publications/en/details.jsp?id=3983&clang=EN>
- World Trade Organization (WTO). (1994). *Uruguay round agreement: TRIPS. Part II – Standards concerning the availability, scope and use of intellectual property rights, section 3: Geographical indications*. WTO.