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Taste of home: Birth town bias in Geographical Indications

Giuliano Resce
Cristina Vaquero-Piñeiro

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Taste of home: Birth town bias in Geographical Indications

Giuliano Resce*, Cristina Vaquero-Piñeiro†

Abstract

We investigate the role of local favoritism in the Geographical Indications (GIs) quality scheme, one of the main pillars of agri-food policy in the EU. Taking advantage of a rich and unique municipalities' geo-referenced database over the 2000-2020 period, we evaluate whether the birthplaces of Regional council members are favored in the acknowledgment of GIs in Italy. To address the potential confounding effects and selection biases, we combine a Difference in Difference strategy with machine learning methods for counterfactual analysis. Results reveal that councilors' birth municipalities are more likely to obtain their products certified as GIs. The birth town bias is more substantial in areas where the level of institutional quality is lower, there is higher corruption, and lower government efficiency, suggesting that the mediation of politicians is determinant where the formal standardized procedures are muddled.

Keywords: Political Economy; Geographical Indications; Political representation; Electoral success; Local Development.

JEL Classification: D72; L66; Q18; R11.

*Department of Economics, University of Molise, Via F. de Sanctis - 86100 Campobasso, Italy.
giuliano.resce@unimol.it

†Department of Economics, Roma Tre University, Via Silvio D'Amico 77 - 00145 Rome, Italy.
cristina.vaqueropineiro@uniroma3.it

1 Introduction

It has been shown that elected policymakers have the power to modify policies in favor of specific areas (Hodler and Raschky, 2014). Usually, politicians tend to favor localities that have supported them in previous elections, but also their own hometowns and native areas, regardless of the level of electoral support (Carozzi and Repetto, 2016; Mattos et al., 2021; Bommer et al., 2022; Kaba, 2022). Empirical evidence exists in this direction showing how elected policymakers make strategic use of public resource allocation at the territorial level (Brollo and Nannicini, 2012; Veiga and Veiga, 2013; Brollo et al., 2013; Bracco et al., 2015). In the EU context, there are many specific governmental place-based and community-led policies that can really work as catalysts for the socio-economic development of specific territories. As part of these policies, in addition to public expenditure, there are several policy outcomes by which political favoritism can manifest itself.

This study focuses on a specific EU place-based socio-economic development policy under local political management: the Geographical Indications (GIs) quality scheme. The GI label is granted only to products that are guaranteed to have an intrinsic link with the area where they are made, not only conceptually, but also in practice, given that the majority (for Protected Geographical Indications) or all (for Protected Designation of Origin) of the production process has to be located within a delimited geographical area (i.e. the region of origin) (Resce and Vaquero-Piñeiro, 2022).¹ The linkage with the region of origin is therefore the pillar of this quality scheme: GIs certify local agri-food productions that are legally tied to their territorial environmental characteristics, human knowledge, and traditional expertise.

Over the years, this policy has however gone beyond its principal aim of preserving local high-quality agri-food productions becoming a key strategy for supporting socio-economic development and creating benefits for local inhabitants. GIs exert several welfare effects at both individual and territorial levels by reducing market information asymmetry, guaranteeing product differentiation, and increasing added value (Menapace and Moschini, 2014; Gangjee, 2017; Agostino and Trivieri, 2014; Haack et al., 2019; Török et al., 2020). All these generated benefits directly affect the area of origin of the certified product. However, not all agri-food products will become GIs and determining which factors are most influential is the focus of new

¹Regulation available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R1151>; <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0034>

studies demonstrating the role of sectorial, social, and cultural elements (Vaquero-Piñero, 2021; Haeck et al., 2019; Charters and Spielmann, 2014). Among these elements, little attention has been paid to understanding whether the probability of obtaining a GI is mediated by local politicians' interests (favoritism). While asserting the role of politicians in negotiating the final decision is quite intuitive given the EU regulations, providing evidence of the extent to which these dynamics condition the certification process is far from easy, but possible. In Italy, for example, the request for registering the name of a product is assessed by regional councillors (more details are provided in Section 2).

In this paper, we investigate, for the first time in the literature, whether the opportunity of achieving a local production certified as a GI changes when a member of the regional council comes from the place of origin of that production. In other words, we test whether the birthplaces of regional council members are favored in the acknowledgment of GIs. We answer this question in the context of the Italian wine sector, which is an excellent case study for several reasons. Firstly, Italy is the country with the highest number of GIs with wine leading this market (526: 408 PDO and 118 PGI) for its historical and economic value in Italy (27 billion, value of bottled wine). The literature demonstrates that the wine sector is the single sector for which intangible informal features, such as socio-cultural elements, in supporting the GI certification matter the most Resce and Vaquero-Piñero (2022).

Secondly, in Italy, political candidates are assigned to different polling stations and voters are assigned to each station according to their residential addresses. Political parties put forward local politicians in those polling stations where the probability of being elected is higher and this very often coincides with their residential area. During the Italian regional elections, voters not only elect the President of the Region, but also regional councillors.

After the election, the number of votes received by each candidate in each polling station is publicly available. Consequently, incumbents know precisely where their votes come from leading to a potential partisan decision during their government. They should in fact be more generous if elected to represent the geographical area which voted for them (Caselli and Falco, 2022; Gulino, 2020).

Lastly, due to the current political instability and the high probability of early elections, candidates are often venturing to "promise" something new after only few years in order to retain their offices. In this context, political forces and institutional leaders, interested in a rejuvenated relationship with local communities, have started

to leverage on territorial uniqueness as a source of economic benefits through space-linked strategies, such as GIs or the UNESCO World Heritage List. According to the socio-historical agri-food literature, following the end of World War II, geographical borders become as much and even more important than production processes for marketing needs that were finding enthusiastic support from politicians who were looking for new territorial electoral bases.

We exploit variation in GIs acknowledgment and voting results across all Italian municipalities over the time period 2000-2020. We use a novel yearly municipal-level dataset that reconstructs the time-space variability of regional legislators' birthplaces and GI certification at such disaggregated territorial level (i.e. municipality). From an empirical perspective, we implement a Differences-in-Differences (DiD) design on a panel of 2954 municipalities from 2000 to 2020. To address the selection bias due to the intrinsic differentiation between the hometown municipalities of regional councilors and other municipalities, we resort to machine learning methods in the building of the counterfactual scenario. To generate the artificial control group, we predict the regional councillors in municipalities using a set of demographics and socioeconomic characteristics referring to the census of 1991, by means of the best method out of four algorithms that we tested: (1) the least absolute shrinkage and selection operator (LASSO); (2) the random forest (RF); (3) gradient boosting machines (GBM); (4) and the neural network (NN). Once the predictions have been validated out of the sample, only municipalities classified as hometowns of regional incumbents are considered as controls in the DiD estimates.

Results reveal that the hometowns of regional incumbents obtain more GIs. The positive impact is stronger in municipalities with lower levels of institutions, there is higher level of corruption and lower government efficiency. This suggests that the mediation of politicians is more important for obtaining public services where the formal standardized procedures are muddled and public outcomes are not provided transparently. In the case of GIs, achieving the certification would require a long wait without the support of politicians.

This is the first article that studies how incumbents' residential birth-town may affect the achievement of a GI. This article contributes to different strands of the literature. First, we contribute to the recent literature on the drivers of GI certification by estimating, for the first time, the role of institutional mechanisms behind the GI certifications acknowledgment (Resce and Vaquero-Piñeiro, 2022). Secondly, this study relates to the literature studying the consequences of political elections on

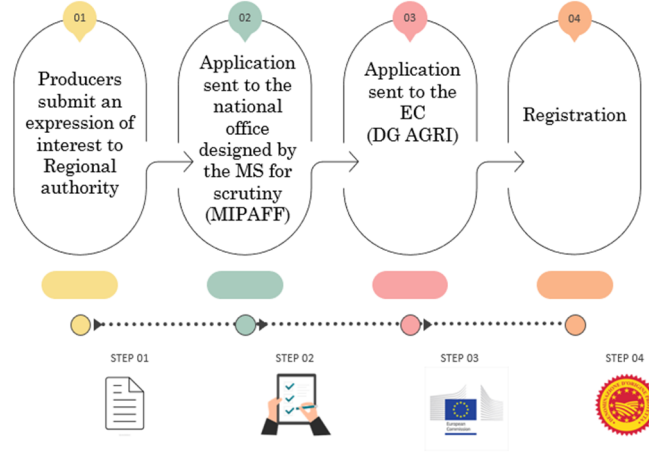
socio-economic development and the allocation of political outcomes (Di Cataldo and Mastroiocco, 2021). To this literature, we contribute by exploring the consequences of a new peculiar outcome, the GI certification. Lastly, we contribute to the literature that studies the rationales of place-based policies, their weaknesses, and strengths (Rodrik and Sabel, 2022).

The remainder of the paper is structured as follows: the next section presents the institutional setting, while data and methods are described in section 3. Section 4 discusses the main results, section 5 presents heterogeneity tests, and section 6 concludes.

2 The ongoing institutional setting of wine GIs

The regulatory basis of the current GI quality scheme has been established by French and Italian laws, in the 1930s and 1960s respectively, which were designed to differentiate high-quality wines. Over the years, the GI scheme has been extended to other agri-food products and to non-EU countries. Currently, more than 3000 EU agri-food products are regulated under this scheme (1463 food and 1606 wine). As of December 2022, Italy is the country with the highest number of products certified as GIs, 845 (319 food and 526 wine). In the literature, there is a consensus relating to the idea that GIs represent an endogenous opportunity for context-sensitive development, especially in rural areas (Gangjee, 2017). On the one hand, GIs generate premium pricing (Duvaleix et al., 2021), shape consumers' willingness to pay (Menapace et al., 2011), support farmers' income (Poetschki and Dries, 2021) and added value to the local agri-food sector (Cei et al., 2018). Rent-seeking and land values were also found to have drastically changed after obtaining GI. For instance, in the Tuscany region (Italy), one hectare in the Brunello di Montalcino area costs around 700 thousand euros (+ 4500 percent in comparison with the cost before the DOC certification), while one hectare in the Conegliano Valdobbiadene – Prosecco DOP area currently costs around 600 thousand euros, with a constantly increasing trend after the 2009 DOCG certification (CREA, 2022). On the other hand, at the territorial level, the literature demonstrates that GIs generate socio-economic development spillovers in terms of population growth and economic reorganisation towards segments of higher added value (Crescenzi et al., 2022), sustainability (Vandecastelaere et al., 2018) and international competitiveness offering protection to local productions from fraud and misleading competition from standardized global competitors (Curzi and Huysmans,

Figure 1: GI certification process



2022; DEF, 2022).

Actually, the GI quality scheme for agricultural products and foodstuffs is governed by Regulation (EU) No 1151/2012 on quality schemes. Part of the common organization of the markets, the wine sector is covered under its specific regulation implementing the GI quality schemes (the Commission Implementing Regulation (EU) 2019/34 for Geographical Indications).²

However, being a local high-quality product is not a sufficient condition for becoming a GI. Recently, Resce and Vaquero-Piñeiro (2022) have developed a machine learning model specifically to study which socio-economic and geographical conditions are of significant importance in predicting which territories will obtain a GI in the immediate future in Italy. However, among drivers, they do not consider the mediatorial role played by politicians in the certification process, which should, however, play a crucial role and mediate the final decision. The process of registering for GI protection, which is the same for both food and wine, can be summarized as reported in Figure 1 above. It is initiated by a group of local producers that submit an expression of interest to the policy of jurisdiction, which in Italy is the regional council of the administrative region(s) where the GI is produced (NUTS2 level). Af-

²Documents available at: https://agriculture.ec.europa.eu/farming/geographical-indications-and-quality-schemes/geographical-indications-and-quality-schemes-explained/regulations-wine_en

ter examining the application, the council decides on its acceptance or rejection. In the case of a positive response, the application is sent for scrutiny to the national office designed by the Member States and, then, to the European Commission (EC) for the final examination. At the EU level, such policy is implemented through the Directorate-General (DG) for agriculture and rural development.³ Throughout the entire process, Regional Authorities are consulted before making any decisions.⁴

The influence of Regional Authorities goes beyond the certification process. They also play a key role also in the Common Agricultural Policy (CAP). In particular, given the governance structure of the EU Rural Development Policy (the so-called Second Pillar of the CAP), regional authorities are, in fact, the main bodies responsible for Rural Development Programs. They operate through several measures that disburse resources to actors involved in the agri-food sectors by choosing, for example, which measure activates or which productions support. In the end, these decisions can influence the agri-food system characteristics, favor privileged interests, and affect farming specialisation and public investment choices (Greer, 2017). For instance, they can incentive firms to specialise in specific productions, upgrade their quality standards, or to cooperate to preserve local productions collectively (Asheim and Cooke, 2011). In addition, given that the RDP includes a specific measure to finance newcomers in GI production, the achievement of a GI will most likely lead to an increase of EU funds for producers located within the region of origin.⁵

³Commission Implementing Regulation (EU) 2019/34 of 17 October 2018 laying down rules for the application of 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, amendments to product specifications, the register of protected names, cancellation of protection and use of symbols, and of Regulation (EU) No 1306/2013 of the European Parliament and of the Council as regards an appropriate system of checks. C/2018/6621; Commission Implementing Regulation (EU) 2019/34 of 17 October 2018 laying down rules for the application of 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, amendments to product specifications, the register of protected names, cancellation of protection and use of symbols, and of Regulation (EU) No 1306/2013 of the European Parliament and of the Council as regards an appropriate system of checks

⁴Standard amendments are approved and made public by the Member States, while any opposition to the registration can be raised within three months of the date of publication in the EU Official Journal

⁵In the FEASR Programming Period 2014-2020 the measure was 3.1.1 New participation in quality schemes. The new 2023-2027 Strategic Plan confirms the presence of funds for supporting

The achievement of a GI may therefore be affected by specific policymakers who can mediate both the development of local agri-food systems and the GI certification decision. With the aim of increasing the uptake of GIs across the EU in order to benefit the rural economy and achieve a higher level of protection for products, especially online, in March 2022 the EC adopted a proposal for a regulation reform of the GI quality scheme that should be approved in the next few years.⁶ Among others matters, the EC proposes to reform the GI regulation to shorten and simplify the registration procedure and empower producer associations to manage, enforce and develop their GIs. In this context, in the near future, the territorial origin will become even more specific (small areas) with a higher degree of competition among territories as a consequence (and the group of producers and politicians representing them). As a result, we may expect an increasing number of certification applications, and a new form of parochialism, as each territory will defend its uniqueness and economic interests. The origin will become a mass-demanded fundamental requirement for producers to differentiate their products and origin-linked certifications may become a way to affect voters' behaviour.

In this respect, this study, therefore, has implications for both policy proposals. On the one hand, knowing which are the contextual factors that support the inclusion of territories within a GI area and make the certification procedure "easier" would become relevant to designing a more efficient policy and shaping public decisions. On the other hand, the awareness of the influence of local politicians has made the EC more cautious in deciding on which would be the best way to enhance producers' engagement.

3 Data and methods

Our analysis is based on a geo-referenced municipality-year panel data set based on the 2000-2020 period. To identify the sample, starting from the entire list of Italian municipalities, we restrict the sample to municipalities with a positive level of viticulture (more than 0 ha), which are the only ones that can qualify for obtaining

high-quality certified productions

⁶Proposal for a Regulation of the European Parliament and of the Council on European Union geographical indications for wine, spirit drinks, and agricultural products, and quality schemes for agricultural products, amending Regulations (EU) No 1308/2013, (EU) 2017/1001 and (EU) 2019/787 and repealing Regulation (EU) No 1151/2012 COM/2022/134 final

a wine GI. Then, we limit the sample to wine PDOs, which are the only type of GIs completely processed within the region of origin.⁷ This legislative peculiarity allows us indeed to rule out any other confounding effects. Lastly, we exclude municipalities that already had at least one PDO in 1999 as we do not have regional legislator data for previous years. We end up with 2954 municipalities, of which 844 receive at least one PDO in the 2000-2020 time interval (528 municipalities obtained one PDOs, 302 obtained 2 PDOs, 13 obtained 3 PDOs, and 1 municipality obtained 4 PDOs). Figure 2 shows the spatial distribution of PDOs obtained in the 2000-2020 time interval across Italian municipalities. Birthplace towns for regional councillors were extracted on an annual basis from publicly available information on the website of the Italian Ministry of Interior.⁸ Descriptive statistics for the years 2000, 2010, and 2020 are reported in Table 1.

To estimate the effect of being the birthplace of regional councilors on the municipal GIs, we set up a DiD study design. The basic approach of DiD is to compare the difference in outcomes after and before the intervention between two groups. The use of DiD allows the avoidance of the endogeneity problems typical of comparisons between heterogeneous groups (Meyer, 1995).

The estimated model is as follows:

$$y_{it} = \theta_i + \lambda_t + \beta_0 X_{it} + \beta_1 Pol_{i[t-1:t-10]} + \varepsilon_{it} \quad (1)$$

Where:

- y_{it} is the outcome of interest, i.e., number of GIs recognized in the municipality i at year t , where $t = [1999 : 2020]$;
- θ_i is municipal-level fixed effect;
- λ_t is time-level fixed effect;
- X_{it} is a vector of time-variant municipal-level covariates that includes the socio-economic and agricultural context of municipalities. In this vector, we include censuses data on agricultural factors and socio-demographic characteristics in addition to spatial lags (see Table 1 for descriptive statistics);

⁷For PDOs every part of the production, processing, and preparation process must take place in a specific region. In the case of wine PDOs, this means that grapes have to come exclusively from the geographical area where the wine is made

⁸Data available at: <https://dait.interno.gov.it/elezioni/anagrafe-amministratori>

Figure 2: Spatial distribution of new PDOs in the 2000-2020 time interval

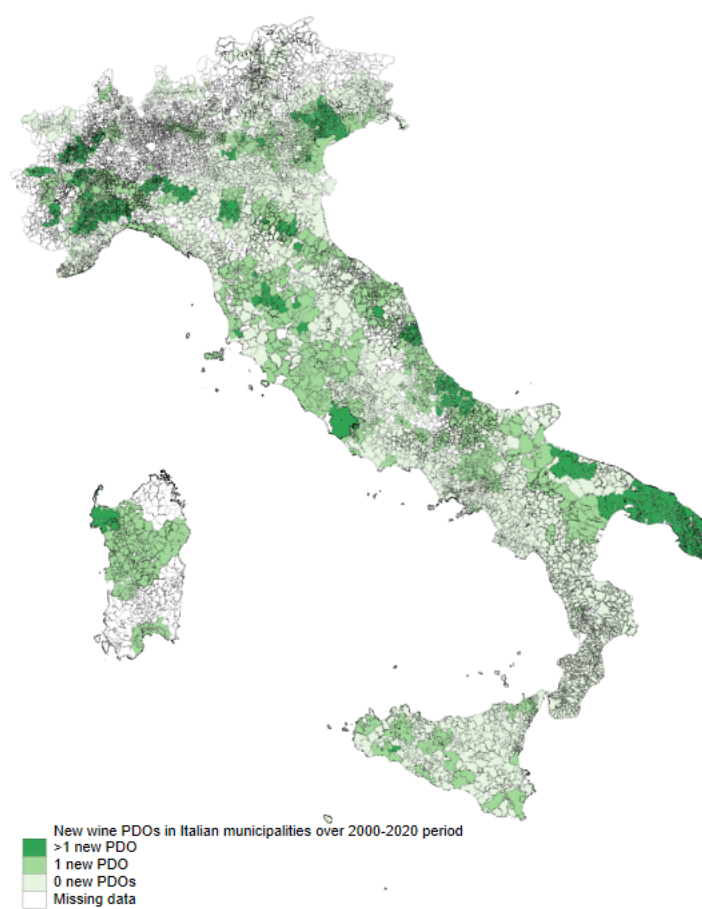


Table 1: Descriptive Statistics

Year	2000	2010	2020
Number of wine PDOs	0.000 (0.000)	0.244 (0.540)	0.398 (0.689)
$Pol_{i[t-1:t-10]}$	0.135 (0.341)	0.169 (0.375)	0.115 (0.319)
Agricultural factors			
Agricultural land diffusion	48.220 (24.442)	44.324 (25.764)	41.147 (26.255)
Family farms	0.888 (0.124)	0.902 (0.116)	0.842 (0.152)
Winegrowing specialisation	0.390 (0.251)	0.306 (0.227)	0.000 (0.000)
Winegrowing farms	5.719 (6.389)	3.627 (4.653)	1.471 (2.156)
Socio-demographics			
Employment rate	40.689 (8.778)	42.599 (8.727)	44.673 (7.723)
Agriculture employment	13.997 (11.627)	10.032 (8.714)	9.477 (9.158)
Population density	245.743 (626.195)	258.321 (598.622)	266.538 (551.047)
Elderly population	8.325 (3.259)	10.004 (3.615)	12.001 (3.99)
Vulnerability	100.133 (3.384)	98.676 (2.221)	98.955 (1.636)
Remoteness	22.325 (19.222)	20.936 (18.298)	20.351 (18.109)
Spatial lags			
Employment rate spatial lag	40.686 (7.93)	42.514 (7.431)	44.694 (7.038)
Agriculture employment spatial lag	14.112 (9.24)	23.036 (15.209)	9.577 (7.937)
Population density spatial lag	246.908 (481.867)	240.578 (474.326)	266.455 (437.994)
Vulnerability spatial lag	97.560 (0.727)	96.909 (0.649)	97.890 (0.712)

Mean and (standard deviation)

- $Pol_{i[t-1:t-10]} = 1$ if municipality i has been the birth-town of at least a regional councillor's member in the past (we consider 10 years $[t - 1 : t - 10]$), and $Pol_{i[t-1:t-10]} = 0$ otherwise.

The specification in equation (1) defines the generalized DiD (Bertrand et al., 2004). The parameter of interest is β_1 which captures the effect of being the birth town of a regional councillor on the number of GIs obtained by the municipality. We use lagged information about $Pol_{i[t-1:t-10]}$ in order to exclude reverse causality. To strengthen the plausibility of the exogeneity assumption, since unobservable local-level variables and common time trends may bias the coefficient associated with the $Pol_{i[t-1:t-10]}$ dummy, our model accounts for municipal and year fixed effects (Cohen and Einav, 2003).

Within the DiD framework, the identification of the effect of being the birth-town of a regional councillor on the number of GIs obtained by the municipality assumes that the status of birth-town of a regional councillor is exogenous with respect to GIs (Besley and Case, 2000). Of course, the assumption of the exogenous status of birth-town of a regional councillor may be too strong as there can exist a selection bias: being the hometowns of regional councillors depend on several features (demographic and socioeconomic) that are likely to also affect the trend in the number of GIs obtained and, consequently, the estimated difference between treatment and control groups (β_1 in Equation 1). To address this selection bias, we resort to machine learning methods in the building of the counterfactual scenario. A new strand of economic literature increasingly uses machine learning procedures for predictions (Kleinberg et al., 2015), and the predictive power of machine learning is now increasingly exploited for counterfactual building (Varian, 2016; Cicala, 2022). Following this literature, we use a machine learning approach to generate an artificial control group and a counterfactual trend in the non-treatment (non-birth-town of a regional councillor) scenario (Cerqua et al., 2021; Cerqua and Letta, 2022; Resce, 2022). The aim is to address the potential selection bias due to the intrinsic differentiation between municipalities' birth-town of regional councillors and municipalities' non-birth-town of regional councillors. In this way, the selection bias is reduced, balancing treatment and comparison groups on a set of observed baseline characteristics (Varian, 2016).

To achieve the aim of obtaining the control group, we select the best performer algorithm out of four methods:⁹

⁹All models have been implemented using R software trained with the optimisation algorithms available through the `caret` package (Kuhn, 2021).

- the Least Absolute Shrinkage and Selection Operator (LASSO): A regression statistical method that performs features selection and regularization to reduce overfitting and increase prediction accuracy and interpretability (Tibshirani, 1996);
- the Random Forest (RF): A family of randomized tree-based classifier decision trees that uses different random subsets of the features at each split in the tree (Breiman, 2001);
- the Gradient Boosting Machines (GBM): The ensemble method that works in an iterative way whereby at each stage new learner tries to correct the pseudo-residual of its predecessors (Friedman, 2001);
- the Neural Network (NN): The model that uses a set of connected input/output units in which each connection has a weight associated, and learns by adjusting the weights to predict the correct class label of the given inputs (Ripley et al., 2016).

Formally, in equation (1) every municipality i at time t has an associated target binary variable $Pol_{i[t-1:t-10]}$ that takes value 1 if the municipality has been the birth-town of at least a regional councilor's member in the past (10 years), and value 0 otherwise. In order to predict whether municipalities have some probability to be the birth town of a regional councilor on the full panel, we introduce Pol_i which takes value 1 if the municipality is the birth town of at least a regional councilor's member on the full panel and value 0 otherwise. The prediction task is formulated as follows, based on the set of features $Features_i$, find function $f(\cdot)$ (machine learning model) that predicts the municipalities birth town of regional councilors Pol_i :

$$\{Features_i\} \xrightarrow{f(\cdot)} Pol_i. \quad (2)$$

We randomly divide the database as 70 percent for training and 30 percent for out-of-sample testing set (test). The hyper-parameter optimization is only done on the training set using a five-fold cross-validation.¹⁰

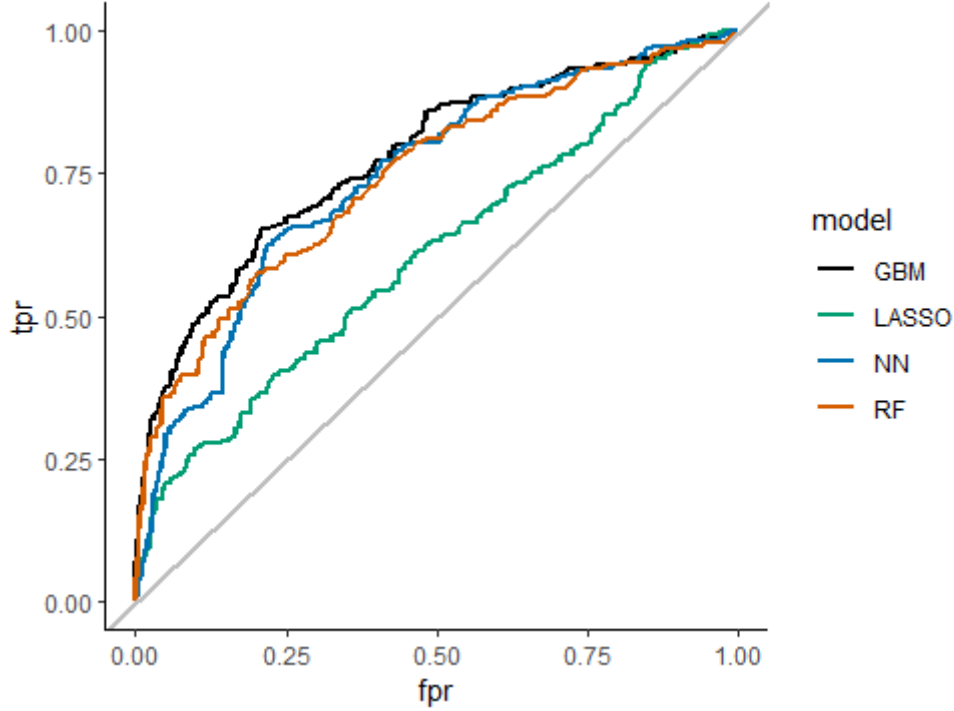
¹⁰Hyperparameters Best Tune for LASSO is alpha = 0.1 and lambda = 0.08343353; for Random Forest is mtry (Number of variables available for splitting at each tree node) = 2; for Gradient Boosting Machine is n.trees (total number of trees to fit) = 50, interaction.depth (number of splits in each tree) = 1, shrinkage (learning rate) = 0.1, and n.minobsinnode (minimum number of observations in terminal nodes) = 10; and for Neural Network is size (number of units in the hidden layer) = 1, decay (parameter for weight decay) = 0.1.

Features_i are included in the prediction task to balance the treated and control group for the heterogeneity that is likely to affect both the election of a regional councillor born in the municipality and the recognition of a local GI. They are all referring to the census year 1991. First of all, we include population and population density to control for what (Caselli and Falco, 2022) (p. 3) has recently demonstrated: given the Italian electoral regulation "lower voter density skews electoral outcomes in favor of incumbent politicians, who have greater retaliatory power against voters who do not support them". We also control the share of the elderly population given that when the share is higher there is a probable risk that voters the candidate can expect in a given polling station could be biased for three main reasons: (1) it could be smaller given that people maintain the right to vote for life, but often elderly people do not vote for physical inability or other limitations; (2) elderly people are those that tend to have a more predictable historical path dependence in their political choices and the probability for candidates to retain office is higher; (3) according to Italian regulation, elderly people diagnosed with physical inability can be accompanied by a family member in the pooling booth and this may affect voters' behavior. These demographic conditions can also affect the acknowledgment of a GIs: (1) areas with a lower level of population or population density tend to be rural or agricultural areas; (2) it is plausible to argue that a higher share of the elderly population can be a proxy of not an attractive place for young generations that conversely are those more interested in developing their hometowns and prone to cooperate and innovate for it.

Regarding socioeconomic features, we select employment rate, the share of families with potential economic hardship, and the index of social and material vulnerability. All these elements are presumably linked with voters' choices as literature demonstrated that when socio-economic conditions are worst, the candidates have a higher "incumbency advantage" in affecting power (Decarolis and Giorgiantonio, 2014; WRIGHT, 2012; Krebs, 1998). The same conditions can affect the acknowledgement of GIs. We can, in fact, hypothesise that people living in areas with lower socio-economic conditions are more interested in finding new sources of development, generating opportunities to open new economic activities and creating new jobs. At the same time, as anticipated in the Introduction, GIs increase rent-seeking, as with public facilities for residential house prices (Emiliozzi et al., 2018; Biagi et al., 2016).

The performance of birth-town classification prediction is assessed by analyzing the Receiver Operating Characteristics curve (ROC) (Fawcett, 2006). In our binary classification problem, the positive class is defined as the municipality birth-town

Figure 3: ROC curve for four ML models



Models trained on 70% of observations and tested on the remaining 30%. The ROC curves are calculated on the test set (30% of the data, the same for each algorithm). AUC: LASSO = 0.6086, RF = 0.7461, GBM = 0.7763, and NN = 0.743.

of a regional councilor, and the negative class is the municipality no-birth-town of a regional councilor. The ROC curve shows the classifier's diagnostic ability by plotting the true positive rate (TPR) on the y-axis against the false positive rate (FPR) on the x-axis since its discrimination threshold is varied (Antulov-Fantulin et al., 2021). When the classification task is completely unpredictable the ROC curve is the diagonal line with an Area Under the Curve (AUC) of 0.5, a perfect classifier, instead, has AUC equal to 1.0, overall, the higher the AUC, the more predictive the model.

The AUC in Figure 3 shows that the GBM model outperforms all the other models. This is confirmed also by looking at other measures of performance shown in Table 2. In particular, Table 2 shows that the accuracy of GBM is statistically higher than the no information rate. The second best performer model is RF (which also has an accuracy statistically higher than the no information rate), while other algorithms

show lower performance. This is in line with previous empirical applications, confirming that the tree-based models are the more competitive methods for structured binary tasks, especially for municipality classifications (Antulov-Fantulin et al., 2021; Carrieri et al., 2021; Resce and Vaquero-Piñeiro, 2022).

Table 2: Models' performances

	LASSO	RF	GBM	NN
Accuracy	0.8036	0.8284	0.8375	0.7765
95% CI	(0.7759, 0.8293)	(0.802, 0.8527)	(0.8115, 0.8612)	(0.7476, 0.8036)
No Information Rate	0.7923	0.7923	0.7923	0.7923
P-Value [Acc > NIR]	0.2166	0.0039	0.0004	0.8845
Sensitivity	0.0652	0.3587	0.3207	0.3478
Specificity	0.9972	0.9516	0.9729	0.8889
Pos Pred Value	0.8571	0.6600	0.7564	0.4507
Neg Pred Value	0.8028	0.8499	0.8453	0.8387
Prevalence	0.2077	0.2077	0.2077	0.2077
Detection Rate	0.0135	0.0745	0.0666	0.0722
Detection Prevalence	0.0158	0.1129	0.0880	0.1603
Balanced Accuracy	0.5312	0.6551	0.6468	0.6184

Figures are estimated on the confusion matrix, which shows a cross-tabulation of the observed and predicted classes, generating the predicted classes based on the typical 50% cutoff for the probabilities (Kuhn, 2021).

As the best model, the Pol_i predicted by the GBM (retrained on the full database to maximize the accuracy gains) is used to obtain the control group, i.e., we only select no-birth-town municipalities with $pred(Pol_i) = 1$ for estimating the difference between treatment and control groups (β_1 in Equation 1). In other words, we use the false positives as non-birth-town municipalities in the DiD estimates. Having the non-birth-town municipalities a $pred(Pol_i) = 1$, the new sample of municipalities used in the DiD estimates has lower selection bias due to the intrinsic differentiation between municipalities being the birth-town of regional councilors and municipalities not being the birth-town of regional councilors.

4 Results

Table 3 reports the regression estimation coefficients of equation (1). Model 1 presents our baseline specification, conditional on municipalities' dummies and year-fixed effects. Model 2 replicates the analysis by including control variables related to the

agri-food sector. Areas more devoted to farming activities will be, in fact, more prone to obtain certification for their products. Model 3 accounts also for socio-demographic contextual factors, which can affect the acknowledgment of GI in each municipality (Resce and Vaquero-Piñeiro, 2022). Finally, Model 4 also includes spatial lags. All models have been implemented twice, using both all municipalities in the control group (left panel) and only municipalities with $pred(Pol_i) = 1$ in the control group.

Through all the different specifications, the coefficient for the birthplace of regional councilors is positively associated with obtaining a GI in the municipality: the birthplaces of regional politicians obtain more GIs. The political factors are persistent to agricultural and spatial factors, i.e., the positive association with $Pol_{i[t-1:t-10]}$ indicates that - *ceteris paribus* - the political conditions affect the level of GI certified at the local level. Furthermore, the positive effect $Pol_{i[t-1:t-10]}$ on the number of GIs is confirmed when the sample of municipalities used in the analysis is balanced by $pred(Pol_i) = 1$ (the right panel). These results might suggest that when local politicians become regional authorities they are interested in promoting the certification of high-quality local production. This evidence may be an indication of the fact that the regional councilor put the effort into favoring their hometown localities.

The opportunity for protecting local quality advantages in the agri-food industry and benefiting from their economic spill-overs depends, among other place-sensitive factors, on the mediatory role of local politicians. The result suggests some interesting policy reflection, given that GIs have been endorsed by the role played by drivers of socio-economic benefits at the micro and meso levels (Török et al., 2020). The opportunity of obtaining a GI will indeed generate positive spill-overs in the regions of origin. On the one hand, they are likely to trigger the economic performance of the local agri-food system (e.g., farmers' income, and welfare conditions). On the other hand, sustainable development paths of the territories included within the region of origin will be supported by the presence of GIs, especially in rural areas. Our results are, therefore, a welcome basis for reflecting within the GIs' regulation framework regarding which criteria should be met to certify one product, rather than another, or for selecting which areas should be included.

Table 3: Regression Results

	All Municipalities							
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
$Pol_{it-1:t-10}$	0.016 ** (0.006)	0.016 ** (0.007)	0.015 ** (0.007)	0.017 ** (0.007)	0.021 *** (0.006)	0.022 *** (0.007)	0.021 *** (0.006)	0.022 *** (0.007)
Agricultural factors								
Agricultural land diffusion		0.001 *** (0.000)	0.001 *** (0.000)	0.001 *** (0.000)		0.001 *** (0.000)	0.001 *** (0.000)	0.001 *** (0.000)
Family farms		0.090 *** (0.02)	0.147 *** (0.02)	0.141 *** (0.021)		0.216 *** (0.038)	0.224 *** (0.038)	0.192 *** (0.039)
Winegrowing specialisation		-0.436 *** (0.013)	-0.382 *** (0.013)	-0.358 *** (0.013)		-0.479 *** (0.025)	-0.392 *** (0.026)	-0.376 *** (0.027)
Winegrowing farms		-0.005 *** (0.001)	-0.006 *** (0.001)	-0.006 *** (0.001)		0.000 (0.002)	-0.002 (0.002)	-0.004 ** (0.002)
Socio-demographics								
Employment rate			-0.007 *** (0.001)	-0.007 *** (0.001)			0.003 (0.002)	-0.002 (0.002)
Agriculture employment			-0.008 *** (0.001)	-0.008 *** (0.001)			-0.006 *** (0.001)	-0.009 *** (0.001)
Population density			0.001 *** (0.000)	0.000 *** (0.000)			0.000 *** (0.000)	0.000 (0.000)
Elderly population			-0.005 *** (0.001)	-0.008 *** (0.001)			0.023 *** (0.003)	0.026 *** (0.003)
Vulnerability			0.020 *** (0.002)	0.022 *** (0.002)			0.054 *** (0.004)	0.057 *** (0.004)
Remoteness			-0.001 ** (0.000)	-0.001 ** (0.000)			0.000 (0.001)	-0.001 (0.001)
Spatial lags								
Employment rate spatial lag				-0.003 *** (0.001)			0.007 *** (0.002)	0.007 *** (0.002)
Agriculture employment spatial lag				-0.001 ** (0.000)			0.001 ** (0.001)	0.001 ** (0.001)
Population density spatial lag				0.000 *** (0.000)			0.000 *** (0.000)	0.000 *** (0.000)
Vulnerability spatial lag				-0.028 *** (0.003)			-0.074 *** (0.006)	-0.074 *** (0.006)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	62034	57160	57160	55920	15141	14315	14315	14055

Mean and (standard deviation); *** p < 0.01; ** p < 0.05; * p < 0.1.

5 Heterogeneity of the results

In the previous section, we prove the general positive effect of being birthplaces of regional politicians to obtain GIs in the municipality. However, since the presence of GIs is clearly not random, and the relation between politicians' characteristics and achieving a GI could be mediated by the well-functioning of institutions, our empirical analysis has to deal with it before drawing a conclusion. Contributions of political economy have shown that in case of low quality institutions voters are more likely to vote based on criteria of private gain, rather than social cooperation (Nannicini et al., 2013). Electoral competition is assumed stronger in territories with bad institutions and the mechanisms at play can range from asymmetry information, and favoritism (preferences) to outright corruption (Nannicini et al., 2013).

In this section, we aim to explore the main mechanisms behind the narratives consistent with our findings. Firstly, the connection between being the birthplace of a regional councillor and the attainment of GIs can be pondered by the quality of local institutions. In territories with good institutions, applicants operate in areas presumably characterised by higher-level of cooperation and collaborative action. The literature has, in fact, recognized, and proven, that areas with higher-level of institutional quality are fertile contexts for creating fruitful networks and sharing informal knowledge in support of local production systems.¹¹ At the same time, applicants could be more confident to obtain support and clear information for their application.

To perform different sample splits in accordance with different levels of institutional quality we use the provincial Institutional Quality Index (IQI) estimated by Nifo and Vecchione (2014), available only at the NUTS-3 level.¹² Results are shown

¹¹The complex interplay between productive, cultural, and spatial relations of territories becomes a source of the territorial competitiveness mentioned by the industrial cluster scholars Becattini, 1979. What Marshall (1890) called "something in the air" works as the catalyst of dynamic external economies, collective actions, and social interactions.

¹²From a data perspective, composite indices such as the Worldwide Governance Indicators have shown great potential for measuring Institutional Quality (Kaufmann et al., 2011). Sub-national indices of quality of governance (Institutional Quality Index - IQI) have been proposed in Italy both at regional (NUTS2) and provincial (NUTS3) levels (Nifo and Vecchione, 2014). The items of IQI concern 5 major pillars of institutional quality at provincial level: (1) Voice and accountability capturing the citizens degree of participation in public elections, civic and social associations, the number of social cooperatives, the INVALSI test and the cultural liveliness measured in terms of books published; (2) Government effectiveness measuring the endowment of social and economic structures in Italian provinces and the administrative capability of provincial and regional gov-

in Table 4, reporting the estimates for municipalities in provinces above (left) and below (right) the average IQI.

Estimations show that the positive and significant coefficient is associated with the dummy $Pol_{i[t-1:t-10]}$ only in provinces with low institutional quality, meaning that the birth town bias can be observed only when there is a low quality of local institutions. This evidence seems to suggest that while the overall architecture of institutions is supportive (high) the mediation of politicians is not necessarily needed to activate fruitfully the mechanisms of certification. Conversely, in the case of poor (low) institutions, the role of local authorities is essential. Results are robust, and similar if we look at three key different sub-measures of institutional quality: corruption (columns 4 and 5) government effectiveness (columns 6 and 7), and civic social engagement (columns 8 and 9). This suggests that where institutions are worse, there are revolving doors between having a local councilor and obtaining a GI status. Councilors might informally encourage applications, support their activities or share in-person information on how to apply in areas they are linked to. These findings are consistent with recent studies, showing that corruption influences voters' culture and parties' recruitment policies (Baraldi et al., 2022).

At the same time, unfortunately, we cannot exclude that these mechanisms are driven by collusion or corruption that distorts the correct functioning of democratic systems. Results show, in fact, that the relationship is significant in the case of territories with a higher level of corruption (columns 4 and 5). Regional councilors could be more willing to be bribed to approve certifications if doing so allows them to support their home areas. The findings should be consisted also with the story that in the birthplaces of councilors applicants are more confident that their application will be considered favorably (because of favoritism) or that the councilor has more first-hand information on the application and deliberately (or not) becomes more likely to approve for the certification. Unfortunately, we do not have data to test for these channels.

ernments in terms of health policies, waste management and environment; (3) Regulatory quality concerning the degree of openness of the economy, the rate of firms mortality, indicators of business environment and business density; (4) Rule of law summarizing data on crime against persons or property, magistrate productivity, trial times, tax evasion and shadow economy; (5) Corruption collecting data on crimes against the Public Administration, the number of local administrations overruled by the federal authorities and the Golden-Picci Index.

Table 4: Regression Results: Sample splits on the average

	IQI		Corruption		Government eff.		Voice and acc.	
	High	Low	High	Low	High	Low	High	Low
$Pol_t[t-1:t-10]$	0.002 (0.01)	0.017 ** (0.008)	-0.009 (0.01)	0.031 *** (0.008)	-0.01 (0.01)	0.019 ** (0.008)	-0.009 (0.01)	0.039 *** (0.008)
Agricultural factors								
Agricultural land diffusion	0.001 *** (0.000)	0.002 *** (0.000)	0.002 *** (0.000)	0.001 *** (0.000)	0.001 *** (0.000)	0.002 *** (0.000)	0.001 *** (0.000)	0.001 *** (0.000)
Family farms	0.186 *** (0.029)	0.061 ** (0.027)	0.232 *** (0.032)	0.101 *** (0.026)	0.299 *** (0.031)	-0.096 *** (0.029)	0.194 *** (0.029)	0.069 ** (0.028)
Winegrowing spec.	-0.348 *** (0.018)	-0.168 *** (0.017)	-0.500 *** (0.02)	-0.161 *** (0.017)	-0.215 *** (0.019)	-0.430 *** (0.018)	-0.398 *** (0.018)	-0.261 *** (0.018)
Winegrowing farms	-0.037 *** (0.002)	-0.001 (0.001)	-0.008 *** (0.001)	-0.004 *** (0.001)	-0.031 *** (0.002)	0.005 *** (0.001)	-0.030 *** (0.002)	0 (0.001)
Sociodemographics								
Employment rate	0.003 ** (0.002)	-0.005 *** (0.001)	-0.009 *** (0.002)	0.001 (0.001)	-0.002 (0.002)	-0.008 *** (0.001)	0.001 (0.002)	-0.003 *** (0.001)
Agriculture empl.	-0.001 (0.001)	-0.012 *** (0.001)	0.006 *** (0.001)	-0.015 *** (0.001)	0.001 (0.002)	-0.011 *** (0.001)	-0.001 (0.001)	-0.014 *** (0.001)
Population dens.	-0.001 *** (0)	0 (0)	0 (0)	0 (0)	-0.001 *** (0)	0.000 *** (0)	-0.001 *** (0)	0 (0)
Elderly pop.	0.007 *** (0.003)	0.002 (0.002)	0.006 *** (0.002)	-0.006 *** (0.002)	-0.002 (0.003)	0.001 (0.002)	0.006 ** (0.002)	-0.003 * (0.002)
Vulnerability	-0.002 (0.004)	-0.005 ** (0.002)	-0.009 *** (0.004)	0.009 *** (0.002)	0.012 *** (0.004)	0.002 (0.002)	-0.003 (0.004)	0.010 *** (0.002)
Remoteness	0 (0.001)	0.002 *** (0)	-0.002 ** (0.001)	0.002 *** (0.001)	-0.002 *** (0.001)	0.001 ** (0.001)	0 (0.001)	0.001 ** (0.001)
Spatial lags								
Employment rate sl	-0.014 *** (0.001)	0.006 *** (0.001)	-0.005 *** (0.001)	0.004 *** (0.001)	-0.006 *** (0.001)	0.001 (0.001)	-0.014 *** (0.001)	0.009 *** (0.001)
Agriculture employment sl	-0.006 *** (0.001)	-0.007 *** (0)	-0.010 *** (0.001)	-0.005 *** (0)	0 (0.001)	-0.003 *** (0)	-0.007 *** (0.001)	-0.005 *** (0)
Population density sl	0.002 *** (0)	0 (0)	0.003 *** (0)	0 (0)	0.002 *** (0)	0 (0)	0.003 *** (0)	-0.000 ** (0)
Vulnerability sl	-0.094 *** (0.005)	0.036 *** (0.004)	-0.124 *** (0.005)	0.019 *** (0.004)	-0.097 *** (0.005)	0.013 *** (0.004)	-0.047 *** (0.005)	-0.011 *** (0.004)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Mean and (standard deviation); *** p < 0.01; ** p < 0.05; * p < 0.1.

6 Conclusions

Over recent decades, the number of political promises has far exceeded what has been customary experienced or historically expected. Due to the uncertainty and instability of political cycles, candidates are often seen to be "promising" something new after only a few years in office in order to retain their seats. Among them, the achievement of territorial-linked certifications increases their relevance.

The paper focuses on the inclusion of Italian municipalities within the region of origin of wine PDOs. Given the socio-economic benefits generated by GIs at both producer and territorial levels, the GI has become recognized as an efficient tool in development policy, especially in rural and agricultural areas. This implies that GIs have been receiving increasing attention from local politicians and several of these are local productions that previously had applied for registration over the recent decades. Obtaining a GI can, in fact, one of the political incentives faced by regional governments, who are in charge of such policies and for whom this control could be politically rewarding.

Starting from what the literature has so far accomplished Resce and Vaquero-Piñeiro (2022), in this paper, we have tested, for the first time, whether the regional politicians' birthplaces might affect the possibility of obtaining a PDO wine certification in Italy.

The results, based on the GIs registered and the elections conducted in Italy from 2000 and 2020, indicate that municipalities of legislators' birth towns are more likely to obtain GIs. The hypothesis of a hometown bias affecting the acknowledgement of a GI is therefore confirmed. In particular, the result is higher in territories characterized by a lower level of formal institutions where informal channels have greater power. In fact, the evidence provided in this paper suggests that where formal institutions fail at countering structural disparities, informal channels, such as the space and cultural proximity with local politicians, manage to induce policy outcomes.

The paper has important implications for policy makers. Even though this study was focused on a specific agri-food policy, with this analysis, we were able to contribute not only to the recent, and growing, literature on the drivers of such policy outcomes (GIs), but also to the strand of the literature on the political constraints of what has long been referred to as 'place-based policies'. Evidence about the potential mechanism of GI certification is documented in this paper and it could be a welcome basis for explaining why the EU policies could have a markedly heterogeneous

allocation, and distribution, across territories and actors. While previous empirical studies on decision-making bias have, in fact, mainly found evidence of the political bias on top-down public spending, our analysis reveals that elected policymakers can use their role also to interfere with other community-oriented benefits toward their favorite territories. Therefore, although growing consensus has emerged that supporting the development of territories will not go by without place-based, such as GI, if the implementation of place-based policies is completely mediated by local governments, political bias can upend their intended effects.

Although we have investigated the implications of such interference for the wine sector in Italy, our analysis is relevant well beyond the Italian context, as the broader issue of incumbents' favouritism is a growing topic in a range of countries. We leave the task of extending our analysis to other EU countries to future research.

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7 Appendix

Table A1: Data Description

Variable	Definition
Agricultural land diffusion	Utilized Agriucultural Area/area
Family farms	Share of family employees
Wine growing specialisation	Ration between winegrowing farms and the total number of farms
Winegrowing farms	Winegrowing farms per km2
Employment rate	Ratio of employed resident population to total resident population aged 15 and over
Agriculture employment	Share of economically active population working in agriculture, forestry and fishing sectors
Population density	Population density
Elderly population	Share of over 65 years resident population
Vulnerability	Socio and economic vulnerability indes
Remoteness	Share of people living in remote areas

Sources: National Agricultural Census, ISTAT; National Census, ISTAT.

8 Declaration of interest

Authors have no competing interests to declare