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Cristina Vaquero-Piñeiro

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REDAZIONE:
Dipartimento di Economia
Università degli Studi Roma Tre
Via Silvio D'Amico, 77 - 00145 Roma
Tel. 0039-06-57335655 fax 0039-06-57335771
E-mail: dip_eco@uniroma3.it
http://dipeco.uniroma3.it

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Territorial identity as a facilitator of the EU funds absorption: evidence from the Common Agricultural Policy

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Abstract

This paper assesses the effect of territorial identity as a facilitator of the regional-sectorial absorption of CAP funds within Italy, France and Spain. We test the hypothesis that areas and sectors characterized by community-based and place-sensitive production competences, the reflection of local socio-political values and tacit know-how, attract more funds. Territorial identity is declined in terms of local social capital and measured by a relatedness index, inspired by regional economics but newly used in agricultural economics. Drawing on FADN data over the period 2010-2017, we exploit Fixed Effects and dynamic panel data models. The results demonstrate that local social capital (i.e. territorial identity) significantly affects the absorption of CAP funds for rural development. A positive mediation effect in more-developed regions and for productions that evoke the deepest and most ancient relationship between man and environment, such as winegrowing is found.

Keywords: Territory, Social Capital, Regional Diversification, Common Agricultural Policy
JEL Codes: Q180, R110, Q120, O130, C330

Data declarations

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[1] Department of Economics, Roma Tre University. cristina.vaqueropineiro@uniroma3.it

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INTRODUCTION

The relevance of territorial context for socio-economic development and productive-systems has long been the subject of considerable debate. Scholars have highlighted how exogenous and endogenous factors contribute to constitute a territorial identity capable of affecting socio-economic development, due to their impossible replication in another context (Iammarino et al., 2019; Markus et al., 2018; Boschma et al., 2013). Different definitions and declinations of territory have been proposed, but so far there seems to be no agreement on which is the most appropriate (Capello, 2009a). Among them, an interpretation based on proximities and similarities (i.e. geographical, productive, organizational and cognitive) is frequently suggested (Capello 2009b). Torre (2014, p. 87) states that "territorial proximity is a notion that deals with the complex interplay between productive and spatial relations and their being inextricably linked". Social interaction patterns reflect territorial similarities (Boschma, 2017). Capello (2018) claims that territorial identity expresses itself in common working experiences and cultural practices that require similar capabilities, skills or technologies and generate shared ethical and cultural values able to reinforce people's sense of belonging to their local community. However, this sense of integration is rooted not only in common socio-cultural and political values but rather in the economic advantages that a system of common competencies and local relationships generates for local actors.

As a result, territorial identity is enriched by a cognitive dimension able to capture the presence of production competencies developed through the specialization at the local level. The nature and the effects of such territory-specific relatedness have been investigated by several contributions, inspired by economic geography (e.g., Giannini et al., 2019; Grilltsch et al., 2015; Boschma and Iammarino, 2009). Most of them endorse the idea that relatedness stems from the presence of historical competences, shared knowledge and reputation (Boschma et al., 2013). Indeed, as Hidalgo et al. (2018) demonstrate, related activities demand capabilities that tend to be spatially concentrated and stick to existing production expertise; they are "not random events, or historical accidents, [but events] embedded in territorial capabilities" (Boschma 2017, p.353). Similar production competences are a viable strategy to capture social capital at the local level (Trippl et al., 2019).
Social capital is a multidimensional conceptual framework used for referring to community-based interactions that affect development and cohesion among territories. Bourdieu (1986, p. 248) defines social capital as "the aggregation of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships […], which provide each of its members with the backing of the collectively-owned capital". Generally speaking, social capital refers to inter-personal relations between persons who want to share goals whose outputs are: trust, cooperation, sense of community, culture and traditions (Rivera et al., 2019).
Notwithstanding it has been credited by economic literature with facilitating economic growth and affecting policies effectiveness (i.e. bridging social capital) (Cortinovis et al., 2017; Anderson and Bell, 2003; Putnam, 1993), little attention has been paid to investigate its role in the allocation of EU funds, which is undoubtedly not fully explainable by official exogenous criteria (Incaltarau et al., 2020; Zubek and Henning, 2016).

Regarding the Common Agricultural Policy (CAP), several contributions have studied the determinants of funds absorption (Camaioni et al., 2016; Pascucci et al., 2013), but, at least to the best of our knowledge, this is the first paper that focuses explicitly on the role of local social capital.

We attempt to evaluate whether the funds' absorption capacity is driven by local social capital, meaning strong similarities in community-based production competences and attitudes. The underlying idea is that regions characterized by a stronger level of social capital (which reflects the presence of economic actors significantly linked and engaged in local activities), are more successful in attracting fund supports. This link is especially detectable in the case of rural development policies, due to their local, place-based and bottom-up nature. On the one hand, we could expect an absolute effect, on the other a composition effect driven by the strength of local agricultural lobbies (Polman, 2020; Coen and Richardson, 2009).

Drawing on data from France, Italy and Spain over the period 2010-2017, we focus on the CAP expenditure. The CAP is a perfect laboratory for this research firstly as its theoretical underpinning is becoming more and more bottom-up and place-based with a specific emphasis on the relevance of territory and local capital (OECD, 2018a; Henke et al., 2018).[1] Secondly, it is one of the most relevant EU policies targeting sustainable and resilient development at local level. Especially in the case of Rural Development Policy (RDP), given that the participation of local actors has been recognized as effective in supporting revitalization initiatives against rural decline (Shortall, 2008), interventions are designed as place-community-sensitive to meet local priorities, enhance local strengths and engage local actors. Furthermore, the agri-food sector is an evocative example of how production proximities have shaped local production systems for many decades already. Communities tend to have a common history and socio-cultural behaviour on whose basis they build relationships, co-create know-how and select the type of farming they want to invest in. In Europe, 10.5 million agricultural holdings work in a wide range of different types of farming whose not homogenous geographical distribution reflects the dissemination of local capacities (Asheim et al., 2011).[2] On average, 49% of European UAA is managed by crop-specialist holdings, 35% by livestock-specialist holdings and 16% by mix holdings; livestock-specialists are mainly located in North-West Europe, while crop-specialists are in Mediterranean countries (Eurostat, 2019).

The countries selected are an ideal case study as, although it is not as dominant as in the past, agriculture still looms large in their economy, thanks to the attention they pay to preserve high-quality traditional products. Furthermore, the differences in their sectorial structure and territorial dissimilarities guarantee a significant level of heterogeneity for the analysis.[3] France is characterized by a high share of large farms, young farmers and a higher contribution to the country's economy but a lower one to the employment. Italian agriculture is dominated by small-sized farms, old farmers and a medium contribution to the country's economy and employment. Lastly, Spanish agriculture is characterised by small elderly farming communities, small-middle sized farms and a relevant contribution to the country's economy.

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[1] The CAP is based on two Pillars. While the Frist Pillar regulates direct payments and it is entirely financed by the EU, the Second Pillar (i.e. RDP) is designed to support rural development and is co-financed by Member States. Direct payments, which are granted to farmers in the form of a basic income, are subordinated to cross-compliance, rather to the quantity of production as in the past. Basic requirements are to be active farmers, to have agricultural land and their disposal that is used for agricultural activity, while other eligibility conditions are added for greening, young farmers and small farms schemes.

[2] Types of farming are defined in terms of the relative importance of the different enterprises on the farm. Relative importance is itself measured quantitatively as a proportion of each enterprise's Standard Output to the farms' total Standard Output.

[3] In France 18.3 % of holdings have more than 100 hectares, compared to 2.7% in EU-28); in Italy 58.7 % of holdings have less than 5 hectares and their average size (12 ha) is smaller than the EU-28 average (16.1 ha); Spain accounts for small-medium sized farms that are however larger than the EU-28 average (24 ha).

Regarding methodology, we measure territorial identity in terms of local social capital by calculating a standardized regional-sectorial index accounting for farmers located in a specific region and working in a specific type of farming (TF). This index is commonly used to analyse regional specialization (Cortinovis et al., 2017) and Smart Specialization Strategy (Giannini et al., 2019; D'Adda et al., 2019), but newly applied to agricultural economics. [4] It is, thereby, used to in the estimation model as proxy of local social capital, to evaluate its role in enhancing the CAP funds' absorption. The analysis is conduct at regional-TF level by using FADN data, complemented by EUROSTAT regional statistics and exploiting Fixed Effects (FE) and dynamic panel data estimations.

To better investigate the transmission mechanisms, we also conduct three composition analysis: regional socio-economic conditions, the country the region belongs to and the TF in which regions are specialized. In this way, we can overstep the need for both higher spatial (Camaioni et al., 2019) and sectorial resolutions (Bonfiglio et al., 2016). Indeed, existing literature on CAP distribution overemphasizes political issues of funds' allocation across territories but underestimates the relevance of how these funds are spent within regional economies.

The results support for our hypothesis: local social capital significantly affects the regions ability to absorb CAP funds for rural development. In addition, a positive mediation effect arises for the specialization in a type of farming that evoke deep and ancient relationship between man and environment, such as wine and crops, as well as for more developed regions. Country effects are, conversely, not significant.

We add to the existing literature in several directions. Firstly, this paper contributes to the debate on the non-official determinants of the regional European funds' absorption by providing the first study that explicitly focuses on local social capital as non-official criteria. Secondly, it participates to the on-going discussion about the future of the CAP by (i) bringing forward evidence of the relevance of the territorial identity of European policies and (ii) providing arguments for increasing efforts on social capital and territorial peculiarities as a tangible realization of such identity. By conducting the analysis at regional-sectorial level, this study meets the need to better investigate the inter-sectorial disparities. Methodologically, a new approach to operationalise the evaluation of local asocial capital and territorial identity is proposed.

The paper is structured as follows: Section 2 presents the literature review: thematic and political context. Section 3 describes the empirical setting. Section 4 provides empirical results along with robustness checks, whereas the composition analysis are presented in section 5. Results are discussed in section 6. Conclusion draws some final remarks.

2. LITERATURE

2.1 Territorial identity, local social capital and relatedness: thematic context

Territorial identity is still a vague concept. Sometimes literature tends to assimilate territorial identity with the idea of regional identity referring to feelings of belonging to a group (Chacha, 2012), but this approach is deserving of criticism. Some authors state that territorial identity is a broader concept

[4] EU Smart Specialization Strategy aims to boost economic growth through economic diversification and new path development. It is an explicit placed-based approach for which countries should identify strategic sectors of existing potential competitive advantage, where they can specialize and create capabilities in a diversified way compared to other countries and regions (Asheim et al., 2017).

rooted in common production competences and inter-personal relationships that generate shared economic advantages. They propose a cognitive territorial identity model in which similarities stem from the existence of common competencies that express themselves in the homogeneity of production specialization.[5] Common cultural habits and ethical values are, thereby, generated by such production relatedness, capable of enhancing sense of co-operation, trust and solidarity within local communities (Capello, 2018). Consequently, territorial identity is likely to be stronger where local production systems exist and match more easily private and collective interests.

The positive role of common competences and relatedness in local markets has been strongly emphasized by the literature about agglomeration forces, local externalities and knowledge spill-overs (Boschma and Frenken, 2016; Doring and Schnellenbach, 2006). Although a universally accepted approach to explain such similarities is still missing (Muller, 2016), there is a wide consensus on the idea that relatedness occurs as a result of local contacts among firms specialized in similar or complementary sectors. They demand similar skills and know-how and arise from similar historical development paths. At regional and local level, new activities do not start from scratch, rather learning arises from existing capabilities or from observing the successful activities of neighbours. Literature calls this attitude relatedness, i.e. related diversification. Similarities in working experiences and production activities can, therefore, result in bridging social capital that, unlike bonding social capital, has been, more than once, recognized capable of triggering local development, facilitating exchanges and enhancing human expertise (e.g., Midgley, 2013). As emphasized by Parker (2018), bridging social capital might substitute other unavailable resources especially in regions facing unfavourable economic conditions. However, evidence demonstrates that less-developed areas tend to be characterized by low-quality and bonding social capital, which trigger path-dependences, lock-in and structural bottlenecks (Habersetzer et al., 2019).

The main concern remains to establish a good strategy to account for the unobservable and immaterial dimensions of relatedness (Palan, 2010). Studies have uses employment rates, the deviation of a region's industry structure from the average of a reference country or group of regions and the Herfindahal-Hirschman (e.g., Percoco et al., 2005; Aiginger and Davies, 2004; Storper et al., 2002). More than once, the Krugman specialization index has been used as a relative measure of sectoral heterogeneity across regions (Krugman, 1991). More recently, literature has exploited have location quotients (Allaire et al., 2015), the intensity of input–output linkages (Essleztbichler, 2015), skill-relatedness indicators (Neffke et al., 2016), co-occurrence of technology (Neffke et al., 2011) or by patent documents (Rigby, 2015).

The European agri-food sector is an evident example of how territorial identity is reflected in related diversification (Rivera et al., 2019). Agricultural communities' lifestyles, traditional production processes and diet habits have been shaping agri-food productions for a thousand of years building a complex scenario within which a new set of societal functions has recently emerged (OECD, 2017; EEA, 2017). The CAP has also played a role. In the early years, regional farming was strongly affected by the space-neutral and market-oriented measures of the CAP and farmers were encouraged to undertake monoculture and intensive agriculture (Fabiani, 1986).[6] However, it seems to be clear

[5] In addition, the literature identifies a cultural and a relational model of territorial identity. In the former similarities stem from common cultures and cultural networks, whereas in the latter they are rooted in long-term relationships not necessarily concerning working experiences.

[6] The amount of subsidies received was directly correlated to the quantity produced and economic benefits were biased in favour of the largest farms and richest regions.

that the structural differences of EU agri-food systems are the result of more complex human-environmental linkages. The spatial dependence of each type of farming is, in fact, systemic and based on collective capabilities. The concentration of specific agricultural productions in a region promotes specialization externalities among firms, such as knowledge creation, business interactions and inter-firms skilled workers encouraging neighbour farmers to set up similar and interrelated productions to exploit economies of scale.

The nature of social capital in the agri-food sector has been the subject of considerable debate. For instance, De Los Rios et al. (2016) associate social capital to cooperatives due to their co-working based on trust and transparency. Sutherland and Burton (2011) find that, in Scottish rural regions, social capital is generated by the presence of institutionalized, objectified and embodied symbols of local competences. Social capital is not, however, the unique driver of territorial relatedness in the agri-food sector.

2.2 Territorial identity, local social capital and the Common Agricultural Policy: policy context

Assuming territorial identity as a propulsive asset for socio-economic development, policies targeting local well-being and economic activities beware of the one-size-fits-all approach. This shift in political paradigm is particularly evident in the CAP that evolved form product to producer support and from a space-blind to a place-sensitive approach (EC, 2018).[7] Since the 2003 Fisher reform and the 2008 Health Check, the CAP has undergone a re-orientation towards a more equitable, flexible and space-sensitive strategy in which direct aids, market-related expenditures and export supports have been considerably reduced. Changes in the socio-economic context had indeed shed light on the inadequacy of coupled supports and the complexity of theories on rural development. Conceptually, although the CAP remains classified as a space-neutral policy, the territorial dimension has been increasing its relevance at the expenses of the sectoral one (OECD, 2016a) gaining a central role it has never had. Under the slogan that rural regions are more than "hewers of good and drawers of water" (OECD, 2016b, p.141), RDP aims at revitalizing European rural areas by identifying the structural weaknesses and competitive advantages that regions may have (OECD, 2018b). RDP includes a complementary list of thematic priorities that each region can achieve through context-sensitive and flexible measures tailored to local peculiarities to facilitate the endogenous development of rural communities (Henke et al., 2018). However, the predominance of bottom-up strategies is not without criticism as it may threaten the target by not grasping the full array of influencing aspects (Dax and Fisher, 2018).

In this framework, the role of multi-actor projects, thematic clusters and action groups (i.e. LEADER and Local Actor Groups) is becoming central for rural development as never before. There is an increasing awareness that the development of rural areas is fuelled by capacity building, community-based initiatives and civic engagement between similar people and institutions. They are determinant to share expertise and produce a capacity for trust, interpersonal relations, reciprocity and co-operation (Shortall, 2008). Indeed, farmers are more likely to formulate adequate projects for rural development programmes in which other local actors are already participating or have succeeded in (EC, 2012).

[7] Coupled support are still granted for a list of productions that are particularly relevant for some areas or that are undergone certain environmental difficulties (e.g., mountain products).

A potential path-dependence in funds allocation, generated by the unilateral interest of sectorial agricultural lobbies and local organizations, can, therefore, be presumed. During the negotiation with the EU and the regional RDP calls for tender, the strongest sectors may get the larger part of payments at the expense of the smallest agricultural holdings and organizations. Some evidence suggests that the higher the level of supports and the longer their history, the greater is the farmers' resistance to their removal and the maximization of their effectiveness. Moreover, the type of productions may affect the capacity of attracting funds as some productions can be more easily included in thematic sub-programmes (e.g., young farmers, short supply chains or women in rural area) and obtain additional funds. Given the consistent amount of CAP funds for development, the capacity of regions and farmers to maximize the absorption has created public opinion attention across EU countries, particularly in relation to the post2020 CAP. EU regions show the different capacity of funds absorption and a spatial overlapping with other EU policies (Crescenzi et al., 2015). Farmers' characteristics have been recognized as potential micro-level barrier to the attraction of CAP funds (Shortall, 2008).

Notwithstanding, internal characteristics just represent part of the story, and analysis at micro-farm level is not enough to unpack the policy allocation criteria. Territorial features also can be determinant, but only a few contributions have attempted to evaluate their relevance. Pascucci et al. (2013) highlight that Italian farmers choose to participate in specific RDP programmes on the basis of their geographical locations. Camaioni et al. (2019) likewise find evidence of the relevance of cross-countries differences (i.e. the influence of bordering regions and of their degree of rurality) in influencing the distribution of RDP. Bonfiglio et al. (2016) conclude that, due to the voluntary structure of the Second Pillar, the distribution of funds depends on the economic capacity of regions, i.e. employment rates and GDP. As a result, notwithstanding the strong emphasis put on the role of CAP for farmers and rural development, the number of wide-ranging and detailed studies investigating which are the endogenous determinants of CAP allocation is still scant.

Existing literature is more oriented to investigate the ex-post effects of CAP funds and use allocated funds as an explanatory variable. The common topic is: what would have happened to farmers' market orientation, specialization (Mary, 2013), production (De Castris and Di Gennaro, 2017; Rizov et al., 2013), employment (Smit et al., 2015), technological change (Dudu and Kristkova, 2017) and land value (Ciaian, 2018) if they had not received CAP funds. For instance, Garrone et al. (2019) focus on agricultural labour productivity founding that decoupled subsidies have positive effects and coupled payments a negative one. Esposti (2017) estimates the farms' response to decoupling reforms in terms of market orientation, production choices and investment decisions and finds out that this type of payments have controversial and different effects. The positive effect of such community-related measures on factor-augmenting technical change in agriculture has also been found in Dudu and Kristkova (2017). Other contributions have evaluated the indirect effects of CAP payments on the education level of farmers' children (Berlinschi et al., 2014), agriculture employment (Petrick and Zier, 2011) and out-farm migration (Olper et al., 2014).

Regarding methodology, existing evaluation of the CAP payments are typically based on cross-section regressions (Bonanno et al., 2018), panel data estimations (Crescenzi et al., 2015) and quasi-experimental techniques (Esposti and Sotte, 2013). Even though recent years have seen an increase in the applications of these methodologies (Jerzy, 2019), due to the lack of suitable data and the complexity of the policy structure, applications regarding agricultural policies are only a few and tend to rely on large-scale samples (Michalek, 2012).

3. EMPIRICAL SETTING

The aim is to isolate the effect of local social capital in driving the CAP payment distribution in France, Spain and Italy. The empirical analysis is based on data from FADN, which we complement with regional statistics provided by EUROSTAT. FADN is the only harmonized and standardized source of annual micro-economic data of European agricultural holdings . [8] The annual sample is randomly selected and stratified on three dimensions (i.e. region, economic size and type of farming). It adequately reflects the heterogeneity of European farms and sample farms are representative in all the 3-dimension cells.[9] We collapse beneficiary-level data at the regional-sectorial level (NUTS2-TF) to obtain the spatial-sectorial dimension.[10] To deal with the difficulties in operationalizing the social processes of participation, this paper uses the index in section 3.1 and assesses its impact on CAP funds absorption by the model described in Section 3.2.

3.1 Relatedness index

To capture production proximities in the agri-food sector, we work out a regional-sectorial relatedness index ($RS_{k,i}$) by using the most fine-grained TF disaggregation provided by FADN, i.e. four digits. We define related, the activities that are carried out within the same industry (i.e. the same two-digit code), while activities carried out in different industries are considered unrelated.
$RS_{k,i}$ is the ratio between the share of farms of region k specialized in the TF i and the share of TF i in the country: [11]

$$RSk,i = \frac{Fk,\frac{i}{\sum_{k=1}^{K} Fk,i}}{\sum_{i=1}^{I} Fk,\frac{i}{\sum_{k=1,i=1}^{K,I} Fk,i}} \tag{1}$$

This index can be rewritten as:

$$RSk,i = \frac{Fk,\frac{i}{Fk}}{Fi,\frac{c}{Fc}} \tag{2}$$

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[8] FADN was established by EC Reg. No. 79/65/EEC of 15 June 1965, modified by the EC RegNo 1217/2009 of 30 November 2009 supplemented by the Commission Delegated Regulation (EU) No. 1198/2014 and implemented by the Implementing Regulation (EU) 2015/220. It includes approximately 80,000 holdings (90% of both European UAA and agricultural production) that, due to their economic size, can be considered commercial, and 1,000 variables related to.

[9] The 3-way stratification of the universe allows it to be represented as a 3-dimension matrix, whose each cell corresponds to a specific category of farms, and sample farms are selected from each cell and all cells are represented in the sample. For more information on stratification procedure at: https://ec.europa.eu/agriculture/rica/methodology2_en.cfm

[10] Nomenclature of Territorial Units for Statistics (Eurostat, 2013). Our analysis could be expanded to all European countries, if we had FADN micro-data for all EU countries, or replicates at NUTS3 level if FADN data were statistical representative at that level.

[11] We dichotomize the RS_k with 1 as the threshold.

where $F_{k,i}$ denotes the number of TF farms in region k, F_k is the total number of farms in the region k, $F_{i,C}$ the total number of TF farms in the country c and F_C the total number of farms in the country. This index varies over time and across NUTS2 and TF. The degree of specialization increases in line with $RS_{k,i}$.[12]

$RS_{k,i}$ is standardized as follows:

$$LSCk, i = \frac{RSi, k - \overline{RSi}}{std(RSi)} \tag{3}$$

$\overline{RSi}$ is the mean value of the RS for type of farming i in the whole sample, while std(RSi) is the standard deviation of the RS for TF i in the whole sample. We term it LSC in order to recall its role as proxy of local social capital.

In order to have a clearer view of the spatial distribution of TF across regions over the entire period, we also calculate a proximity index (PR_k) accounting for the share of existing types of farming in which a region is specialized (Annex A1, for specification). PR_k indicates the average proximity between the number of firms belonging to the same TF in the region. It is time and TF invariant for construction.

3.2 Estimation model

Following the conceptual framework of the cognitive model of territorial identity, according to which similarities regard the existence of common competencies developed through a local productive specialization, we use the standardized relatedness index as a proxy of local social capital. The following model is estimated for the First and Second Pillar. [13]

$LSC_{k,i,t}$ is the key variable in the regression as it captures the absorption capacity of the CAP funds. A significant and positive value of parameter □s would denote a systematic association between local social capital and the intensity of the support provided by the CAP, whereas the lack of significance for this coefficient would suggest a neutral distribution of the CAP payments from the spatial

$$\mathrm{Y}_{k,i,t} = \alpha + \sum_{s=0}^{3} \beta_s LSC_{k,i,t-s} + \beta_4 Y_{\mathrm{k,i,t-1}} + \beta_5 \mathrm{P}_{\mathrm{k,i,t}} + \beta_6 \mathrm{R}_{\mathrm{k,i,t-1}} + \beta_7 Agri_{k,i,t-1} + \beta_8 Regional_{\mathrm{k,t-1}} + \beta_9 m(R,s)_{\mathrm{k,t-1}} + \varepsilon_{k,i,t} \tag{4}$$

relatedness viewpoint. $Agri_{k,i,t-1}$ is a set of agricultural controls at regional-TF (k,i) level, while

[12] The lack of a conventional threshold value that explicitly delimits the specialization of a production in a region is the main concern regarding this index (O'Donoghue and Gleave 2004).

[13] Yk,i,,t is the average of funds received by farms specialized in sector i and located in region k at time t divided by the total number of farms located in region k. In the FADN, subsidies relate to current operations linked to the farm production (excluding investments) are entered in a farm's accounts on the basis of entitlement, not because the farm has actually received any subsidies. In this way, we control for the potential endogeneity caused by the different number of farms located in each region.

$Regional_{k,t-1}$ are regional contextual controls. $m(R,s)_{k,t-1}$ is the regional spatial lag accounting for the Pillar's funds average of neighbouring regions. We also include: 1-year lags of the outcome variable ($Y_{k,I,t-1}$), the opposite Pillar per farm expenditure ($p_{k,i,t}$) and the regional average of Pillars expenditure ($R_{k,i,t-1}$). Fixed effects comprise regional (α_k), sectorial (α_i) and time (α_t) fixed-effects.[14] $\varepsilon_{k,i,t}$ is the error term, where standard errors are clustered at regional level.

The coefficient of opposite Pillar expenditure measures the potential trade-off or synergies operating between Pillars. A significant and negative value would suggest an equilibrium between the transfers received, i.e. compensatory mechanism, while a positive sign would indicate a cumulative process among Pillars, (different pillars target the same region-sector group).

When we investigate potential sectorial, regional and country heterogeneity, we augment the baseline model by interaction terms.

We exploit FE and GMM dynamic panel-data estimation.[15] Among panel data estimations, dynamic panel data models are increasingly used in econometrics research to control for omitted variable bias, measurements errors and endogeneity issues (Hsiao, 2007). For instance, GMM estimation is applied to evaluate the effects of CAP on farm labour migration (Olper et al., 2014), to investigates the effect of CAP (Esposti, 2007) and other structural policies (Esposti and Bussoletti, 2008) on regional growth and convergence. Dynamic panel model is exploited by Incaltarau et al. (2020) to assess the impact of administrative capacity and political governance factors on the absorption of structural and cohesion funds. When data for a long time period is available, literature tends to exploit grouped fixed effects models to better control for cross-sectional variability, such as Guastella et al. (2018) that estimate the capitalization of CAP payments into land rental prices.

We control for heteroskedasticity by using robust standard errors clustered at regional level; simultaneity issues by considering explanatory variables lagged over, at least, one period; and for spatial autocorrelation by the spatial lag variable.[16] The absence of spatial autocorrelation across regions has been also confirmed by the Moran's test. Regarding endogeneity, which can be mainly caused by the fact that the concentration of farmers can be driven by unobservable features, we address this issue by using GMM estimations and controlling for the regional average of Pillars expenditure.

3.3 Issues

In this study, we attempt to evaluate whether local social capital influences funds' allocation. Someone could, however, argue that the CAP measures, especially coupled subsidies, have the potential to influence agricultural production, even when they have not a production objective *stricto sensu*. Consequently, they can determine a distortion in agricultural production relatedness. This causal link would be opposite to our hypothesis. Nonetheless, we do not think that this could be the case as agri-food products establish a specialized production is a long-term investment, often linked to centuries-old traditions. For instance, permanent crops farmers need more than seven years to

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[14] In accordance with the Hausmann's test.

[15] Arellano–Bond linear dynamic panel-data estimation.

[16] One-year lagged variables is essential in this study as the willingness to participate in the CAP programs, or the allocation of funds itself, is probably not immediate and has longer-term effects.

classify the farm as specialized in that activity.[17] As in this analysis we focus on a relatively short time span, potential reverse causality is minimized.

Another issue may be referred to the fact that the annual expenditure lacks reliability as independent observation. The whole amount is, indeed, assigned at the beginning of the programming period even if regions can decide when it is most appropriate to spend funds. Consequently, the expenditure reported in a specific year might not be spent in that year. To deal with this issues, the literature suggests computing the average of the programming period (Camaioni et al., 2016; Crescenzi and Giua, 2016) and, therefore, we validate our results for annual expenditures by replicating the analysis with average values (see robustness checks section), thus minimising reverse causality (Mohl and Hagen, 2010).

Regarding the unit of analysis, we decided to consider the response variable for region *k*, rather than for single farm, as ignoring the regional group effects may lead to an overestimation of the impact of farm-level indicators. A more disaggregated territorial level of analysis could be useful to control for spatial heterogeneity as contextual factors become constant for all farmers at regional level. However, NUTS2 is the most disaggregated geographical level for which FADN is declared representative and the use of such aggregation is widespread in the literature.

4. Results

4.1 Data and sample

We use data for Italy, Spain and France: 60 regions (37% in France, 35 % in Italy and 28% in Spain) and 73 different types of farming. The period considered is 2010-2017.[18] The field of observation is highly heterogeneous; our sample includes 32% of FADN farms, and its share is steady over time. Cattle and dairying specialist are the most represented TF, however, field crops and horticulture are the productions in which regions are more specialized (Table 1).

Table 1: Number of regions by type of farming specialization

		Number NUTS2	Share of total (%)
Top 5 TF farming specialisation			
4600	Specialist cattle - rearing and fattening	59	98%
4500	Specialist dairying	57	95%
1510	Specialist cereals, oilseeds and proteins crops	56	93%
1660	General field cropping	56	93%
8330	Field crops - grazing livestock combined	56	93%
Top 5 TF farming specialisation (RS_k>1)			
6120	Field crops and horticulture combined	40	0,66
4840	Various grazing livestock	38	0,63
6150	Mixed cropping, mainly field crops	38	0,63

[17] Crops are categorised into non-perennial (no more than two growing seasons) and permanent (more than two growing seasons, either dying back after each season or growing continuously).

[18] We start from 2010 because in this year there was a reform regarding the type of farming specifications and the economic size classification (Reg. No 1242/2008). Since 2010, the economic size has been measured in terms of standard output rather than in terms of the total standard gross margin of the holding. Moreover, the turbulences observed in the agricultural markets after the 2007 financial crises suggest caution in adding 2008 and 2009 to the analysis period (Esposti and Listorti, 2013). However, focusing on these years we are conscious of the overlapping between two subsequent programming period expenditure, 2007-2013 and 2014-2020. It is worth reminding that funds allocated to a region in any given year have to be spent during that year and/or the next two years. In this way, the observed funds in the early years, 2014 and 2015, could still refer to the previous programming period.

6160	Other mixed cropping	38	0,63

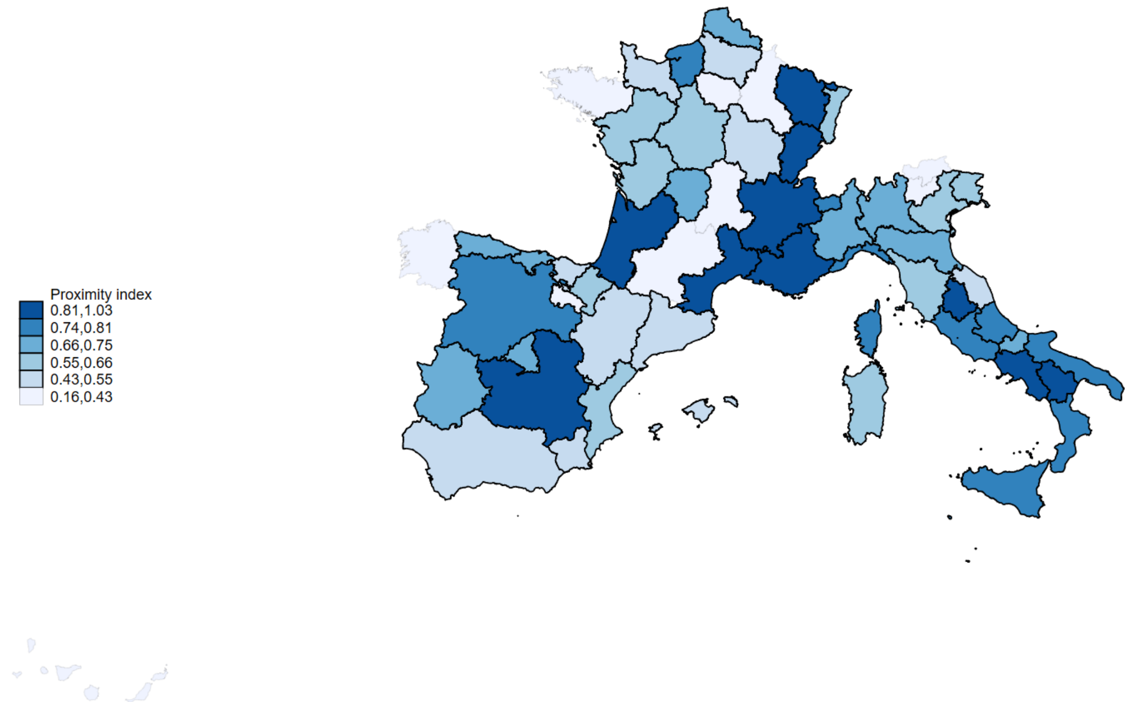
Source: Authors' elaboration on FADN data

On average, Italy is the country with the higher number of specialized sectors for each region (21.04), while Spain has the lowest (13) (Table A1). This result is in line with official stylized facts. At a glance, Italy has a very diversified agriculture with considerable regional variation and small-sized farms, while Spain has a highly heterogeneous agriculture of market-oriented and extensive productions.[19]

There is a large difference around the mean due to the structure of agri-food systems in each region. For instance, data about Principality of Asturias, in Spain, and the Autonomous Province of Trento, in Italy highlights the different agricultural systems of these two regions. They have a similar number of TF with specialization (7 and 8 respectively), but, while in the Principality of Asturias they account for the 50% of the entire number of sectors, in the Autonomous Province of Trento only for 23%. Indeed, whereas in the Italian region we can imagine an agricultural system based on small diversified farms often dedicated to niche mountain foodstuff, and therefore newly specialized in a unique production, the Spanish one exhibits a scenario of intensive agriculture.

Regarding the proximity index, higher values of PR_k are not always associated with higher shares of specialized productions (A3). The geographical distribution of proximity index (PR_k) (Figure 1) shows similarities between the spatial distribution of PR_k and the socio-economic conditions of the regions. Regions with a higher level of proximities correspond to regions classified as less developed or transition regions.[20] This correspondence validates our measurement as confirm, at least descriptively, what literature and stylized facts have pointed out on the path-dependence of less-developed areas in setting up economic activities (Boschma, 2017; Lagendijk and Lorentzen, 2007).

Figure 1: Proximity index in NUTS2 regions



Note: Darker areas denote higher values of proximity Index

[19] More information available at: https://ec.europa.eu/info/publications/cap-your-country_en

[20] More information available at: https://ec.europa.eu/regional_policy/en/policy/how/is-my-region-covered/

Source: Authors' elaboration

In terms of the number of resources, the regional per farm magnitude of Second Pillar rises over time (Table A2) and specialist milk seems to be the TF most supported by both Pillars. A preliminary correlation analysis sheds light on the equilibrium in the relations between Pillars' expenditure and PR_k proximity index as well as the regional-TF absorption between programming periods.

4.2 Estimation results

Estimations for Second Pillar (RDP) expenditure are reported in Table 2, while findings for First Pillar are provided in Table 3.

In all specifications are included: 1-year lags of the outcome variable, 3-years lags of local social capital index and the per farm expenditure of the opposite Pillar (i.e. I Pillar if the outcome variable refers to II Pillar expenditure, and *vice versa*). Agricultural and regional controls are subsequentially introduced (definition, descriptive statistics and estimations are displayed in the Appendix, A4-A7).

Table 2: Local social capital on Second Pillar absorption

	FE				GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local social capital	1.463*** (0.460)	1.462*** (0.466)	1.504*** (0.520)	1.490*** (0.527)	1.765*** (0.693)	1.788*** (0.697)	1.636*** (0.770)	1.619** (0.770)
Frist Pillar	0.042* (0.021)	0.042* (0.021)	0.036** (0.017)	0.035** (0.017)	0.041*** (0.015)	0.040*** (0.014)	0.040*** (0.015)	0.040*** (0.015)
Agricultural controls		✓	✓	✓		✓	✓	✓
Regional controls			✓	✓			✓	✓
Regional spatial lag				✓				✓
Time lagged LSC 0/3	✓	✓	✓	✓	✓	✓	✓	✓
Y t-1	✓	✓	✓	✓	✓	✓	✓	✓
Second Pillar regional average	✓	✓	✓	✓	✓	✓	✓	✓
CAP programming periods	✓	✓	✓	✓				
Year dummies	✓	✓	✓	✓				
Observations	6610	6533	6225	6225	4985	4909	4248	4248
Groups	1583	1573	1525	1525	1410	1392	1319	1319
R-square	0.05	0.20	0.05	0.05				
AR(1) test statistic					-2.61	-2.67	-2.63	-2.64
Pvalue of AR(1)					0.009	0.007	0.008	0.008
AR(2) statistic					0.248	0.199	0.28	0.29
Pvalue of AR(2)					0.803	0.842	0.780	0.768

Source: Authors' elaboration

Note: Robust (cluster at NUTS2 level) standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except First Pillar. In FE, time, regional and sectorial fixed effects are included. In GMM estimation all suitable lags were used as GMM-type instruments, while the first difference of all the exogenous variables were used as standard instruments. Test for multicollinearity has been performed.

The statistically significant positive correlation between local social capital (i.e. territorial identity) and per farm Second Pillar expenditure is pointed out since the specification 1.

A cumulative process among Pillars is evident, albeit the low magnitude. The CAP tends to target the same regional-sectorial areas.

Conversely, the persistence over time of the RDP itself (i.e. the amount received by each farm in the previous year) seems to be not statistically significant.

Agricultural controls (2) show a positive and statistic significant effect of per hectare agricultural market and a negative effect of per hectare net added value. When looking at the role of regional conditioning factors (3), the local social capital maintains the positive and statistically significant impact on RDP allocation. The effect remains positively and statistically significant also when we control for agricultural regional diversification, which has not significant effects on per farm RDP allocation.

In the case of RDP, the local social capital dependence in absolute terms is evident.

Table 3 reports the effects of located social capital on the First Pillar distribution. The dependence of funds' allocation is here no longer evident. As we could have expected, local social capital, is more important in explaining the RDP absorption capacity, than in the case of First Pillar. The First Pillar is, in fact, granted by construction according to farmer status and in respect for cross-compliance. What remains evident is the cumulative process among Pillars.

Table 3: Local social capital on First Pillar absorption

	FE				GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local social capital	0.865 (1.938)	0.798 (1.942)	1.763 (1.761)	1.761 (1.759)	0.198 (1.399)	-0.010 (1.315)	0.539 (1.246)	0.538 (1.247)
Second Pillar	0.148*** (0.057)	0.147*** (0.056)	0.132*** (0.052)	0.132*** (0.052)	0.066* (0.046)	0.061 (0.046)	0.109*** (0.042)	0.109*** (0.042)
Agricultural controls		✓	✓	✓		✓	✓	✓
Regional controls			✓	✓			✓	✓
Regional spatial lag				✓				✓
Time lagged LSC (0/3)	✓	✓	✓	✓	✓	✓	✓	✓
Y t-1	✓	✓	✓	✓	✓	✓	✓	✓
First Pillar regional average	✓	✓	✓	✓	✓	✓	✓	✓
Years dummies	✓	✓	✓	✓				
CAP programming periods	✓	✓	✓	✓				
Observations	6824	6744	6431	6431	5079	5003	4339	4339
Groups	1647	1637	1588	1588	1451	1433	1359	1359
AR(1) test statistic					-1.661	-1.067	-0.450	-0.453
Pvalue of AR(1)					0.097	0.285	0.652	0.650
AR(2) statistic					-0.606	-0.632	-0.733	-0.732
Pvalue of AR(2)					0.544	0.527	0.464	0.463

Source: Authors' elaboration

Note: Robust (cluster at NUTS2 level) standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except Second Pillar. In FE, time, regional and sectorial fixed effects are included. In GMM estimation all suitable lags were used as GMM-type instruments, while the first difference of all the exogenous variables were used as standard instruments. Test for multicollinearity and goodness of fit have been performed.

4.3 Robustness checks

Due to the scepticism on yearly data, we replicate the analysis using the programming period average of funds. Findings are in line with yearly data confirming the positive effect of local social capital on RDP and the not significance for First Pillar absorption (Table 4). This analysis reinforces and generalises the evidence obtained from the baseline estimations.

Table 4: Local social capital on Pillars programming period expenditure

	Second Pillar				First Pillar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local social capital	0.974*** (0.335)	0.947*** (0.335)	0.944*** (0.337)	0.946*** (0.353)	0.752 (1.270)	0.753 (1.271)	1.042 (1.338)	1.062 (1.337)

Other Pillar per farm	0.051 (0.031)	0.051 (0.031)	0.051 (0.031)	0.029 (0.021)	0.168*** (0.069)	0.168*** (0.069)	0.116*** (0.047)	0.111*** (0.047)
Agricultural controls	✓	✓	✓	✓	✓	✓	✓	✓
Regional controls			✓	✓			✓	✓
Regional spatial lag				✓				✓
Time lagged LSC (0/3)	✓	✓	✓	✓	✓	✓	✓	✓
Pillar regional average	✓	✓	✓	✓	✓	✓	✓	✓
Years dummies	✓	✓	✓	✓	✓	✓	✓	✓
CAP programming periods	✓	✓	✓	✓	✓	✓	✓	✓
Observations	7314	7240	6888	6888	7314	7240	6888	6888
Groups	1704	1694	1640	1640	1704	1694	1640	1640

Source: Authors' elaboration
Note: Fixed Effects estimations; robust standard errors (cluster at NUTS2 level) in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except Other Pillar. Time, regional and sectorial fixed effects are included. Test for multicollinearity and goodness of fit has been performed.

Secondly, models are re-estimated by the per-capita spending at regional-sectorial level for the two pillars as outcome variable (Crescenzi et al., 2015). Results confirm the conclusion reached with regard to the baseline specifications: local social capital has either a positive (Second Pillar) or not significant (First Pillar) impact on CAP allocation (Table 5).

Table 5: Local social capital on per capita Pillars expenditure

	Second Pillar				First Pillar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local social capital	0.022*** (0.007)	0.022*** (0.007)	0.024*** (0.008)	0.024*** (0.008)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)
Per capita other Pillar expenditure	-0.121** (0.056)	-0.120** (0.056)	0.127** (0.046)	-0.128** (0.046)	0.001 (0.036)	0.001 (0.036)	0.001 (0.024)	0.001 (0.023)
Agriculture controls		✓	✓	✓		✓	✓	✓
Regional controls			✓	✓			✓	✓
Regional spatial lag				✓				✓
Y t-1	✓	✓	✓	✓	✓	✓	✓	✓
Regional Pillar average	✓	✓	✓	✓				
Time lagged LSC (0/3)	✓	✓	✓	✓	✓	✓	✓	✓
Years dummies	✓	✓	✓	✓				
CAP programming periods	✓	✓	✓	✓				
Observations	6533	6533	6225	6225	6842	6747	6431	6431
Groups	1573	1573	1525	1525	1647	1637	1588	1588

Source: Authors' elaboration
Note: Fixed Effects estimations; robust standard errors (cluster at NUTS2 level) in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except Other Pillar. Time, regional and sectorial fixed effects are included. Test for multicollinearity and goodness of fit have been performed.

Lastly, we take into consideration the potential bias generated by the fact that some regions could be characterized by higher levels of funds in absolute terms. The model has been therefore re-estimated firstly controlling for the quantile distribution of Pillar's expenditure (i.e. in which quantile the region is) and, secondly, using a four-group classification based on the intensity of supports. Taking the overall mean value as a benchmark, we can cluster regions in: top supported regions (both pillars' support intensity above the average), under-supported regions (both pillars' support intensity under the average), first pillar oriented regions (first pillar' intensity over the average, rural support under the average) and rural-oriented regions (first pillar' intensity under the average, rural support over the average). In our sample, the majority of the regions are under-supported (43%), followed by rural-oriented (25%) and first pillar-oriented regions (21%). Top supported regions account for 1% only. Spain is the country with the higher percentage of under-supported regions, France accounts for the higher number of both top supported and first pillar-oriented regions, while Italy is the most representative in terms of rural-oriented regions.

Findings confirm again our results as the association between local social capital and CAP expenditure is not driven by a specific group of regions, neither for quantiles nor for our classification (Table 6). The interactions are indeed not significant.

Table 6: Local social capital on Pillars by intensity of support

	Second Pillar		First Pillar	
	(1) quantile	(2) classification	(3) quantile	(4) Classification
Local social capital	1.453*** (0.577)	1.486*** (0.572)	1.989 (1.972)	0.000 (0.000)
Other Pillar per farm	0.035** (0.017)	0.035** (0.175)	0.131*** (0.052)	0.001 (0.024)
Local social-capital x quantiles	✓		✓	
Local social-capital x classification		✓		✓
Regional spatial lag	✓	✓	✓	✓
Regional controls	✓	✓	✓	✓
Proximity controls	✓	✓		✓
Y t-1	✓	✓	✓	✓
Regional Pillar average	✓	✓	✓	✓
Time lagged LSC (0/3)	✓	✓	✓	✓
Years dummies	✓	✓	✓	✓
CAP programming periods	✓	✓	✓	✓
Observations	6225	6225	6431	6431
Groups	1525	1525	1588	1588

Source: Authors' elaboration

Note: Fixed Effects estimations; robust standard errors (cluster at NUTS2 level) in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except Other Pillar. Time, regional and sectorial fixed effects are included. Test for multicollinearity and goodness of fit have been performed.

5. Composition Effects

In order to unpack the presence of potential heterogeneous effects behind the transmission mechanism of funds allocation, we investigate (1) type of farming, (2) socio-economic regional development and (3) country effects. Results confirm that for cases (1) and (2) emerges a composition effect, while a country-effect seems not to be present (Table 8).

5.1 Composition of expenditure and type of farming

In this analysis, we explicitly take into account the type of farming in which regions are specialized to understand whether the effect of local social capital may be mediated by sectorial specialization (Table 7). In this way, we can investigate the allocation of inter-sectorial mechanisms behind the CAP funds absorption and the presence of composition effects. Production specializations are divided into 14 TF.[21]

[21] Types of farming: crops, field crops, horticulture, wine, orchards-fruits, olives, permanent crops combined, milk, cattle, sheep and goats, granivores, mixed crops, mixed livestock; mixed crops and livestock.

Table 7: Local social capital on Pillars absorption by type of farming specialization

	Second Pillar (1)	First Pillar (2)
Local social capital	1.517*** (0.555)	1.984 (1.968)
Local social capital (Specialized dummy)	-1.603 (1.330)	-0.0317 (2.206)
Local social capital x Specialist crops	4.801*** (2.288)	-
Local social capital x Specialist wine	7.405*** (3.89)	-
Agricultural and regional and controls	✓	✓
Regional spatial lag	✓	✓
Other Pillar per farm	✓	✓
Time lagged LSC (0/3)	✓	✓
Y t-1	✓	✓
Regional Pillar average	✓	✓
Years dummies	✓	✓
CAP programming periods	✓	✓
Observations	6225	6431
Groups	1525	1588

Source: Authors' elaboration

Note: Fixed Effects estimations; robust (cluster at NUTS2 level) standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except Other Pillar. Time, regional and sectorial fixed effects are included. Test for multicollinearity and goodness of fit have been performed. Estimation results are reported only for sectors with a statistically significant effect on the outcome variable.

First of all, the average effect is confirmed: local social capital positively affects RDP funds absorption, but it is not significant in the case of the First Pillar. The positive relation between local social capital and RDP funds increases when regions are specialized in crops and wine. This evidence puts forward that in regions specialized in a type of farming characterized by long term investment and evoking historical expertise stemmed from traditions and cultural values, the role played by local social capital is higher.

5.2 Composition of expenditure and territorial development

The regional socio-economic conditions can also operate as a mediator in the transmission mechanisms and have a potential cumulative effect on funds absorption. . On one hand, the less-developed and rural regions, at least in principle, should obtain more benefits from the policy and be more financially supported. However, literature has highlighted that the intensity of CAP effects is often higher in those areas where conditions for development are more favourable. Our results confirm this mediation effect: the impact of local social capital is stronger more-developed regions (i.e. Cohesion Policy classification).

Table 8: Local social capital on Pillars absorption by regional development and country effects

	Regional effects		**Country effects**	
	Second Pillar (1)	First Pillar (2)	Second Pillar (3)	First Pillar (4)
Local social capital	1.476*** (0.575)	1.799 (2.006)	1.487*** (0.575)	1.789 (2.010)
Local social capital (Specialized dummy)	✓	✓	✓	✓
Local social capital x Less developed regions	-	-		
Local social capital x Medium developed regions	2.548	-0.922		

	(1.724)	(2.882)		
Local social capital x More developed regions	2.473*	-0.626		
	(1.386)	(1.128)		
Regional level of development (dummy)	✓	✓		
France			-	-
Italy			1.208	-1.249
			(1.762)	(2.789)
Spain			-0.794	-0.247
			(1.725)	(3.101)
Country (dummy)			✓	✓
Agricultural and regional controls	✓	✓	✓	✓
Other Pillar per farm	✓	✓	✓	✓
Time lagged LSC (0/3)	✓	✓	✓	✓
Y t-1	✓	✓	✓	✓
Years dummies	✓	✓	✓	✓
CAP programming periods	✓	✓	✓	✓
Observations	6225	6431	6225	6431
Groups	1525	1588	1525	1588

Source: Authors' elaboration

Note: Fixed Effects estimations; robust standard errors (cluster at NUTS2 level) in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except Other Pillar. Time, regional and sectorial fixed effects are included. Test for multicollinearity and goodness of fit have has been performed.

6. REFLECTIONS AND INTERPRETATIONS

A spatial CAP fund's dependence driven by the heterogeneous capabilities of regions has been highlighted by economic literature. What our findings add is clear evidence of the role played by local social capital, which is here considered a proxy of territory identity and measured in terms of production proximities. The role of local social capital does not affect only the presence of sectoral composition effects, more easily presumable, but applies also in absolute terms.

RDP is implemented through rural development programmes that, as we have stressed in the theoretical framework, are initiatives aimed to trigger endogenous development by enhancing local strengths and capabilities. Local social capital assumes a key role in this sense. The feeling of co-operation and participation of communities arises from a strong sense of belonging stemmed from common working experiences and cultural practices of similar people and institutions. Regions, in accordance with local communities, have, in fact, quite an autonomy in drawing up their programmes and personalizing their strategy. The EU does not propose any programme but will only approve programmes submitted.

In this framework, local working capabilities and behaviours can strongly drive the combination of programmes selected for rural development. Regions will be more incline to propose programmes in which they can be successful and to adopt development strategies based on existing capabilities, previous experiences or best practices adopted by neighbouring areas. Given that RDP strongly emphasizes co-operation and co-working between local actors, rural development programmes tend to include a group of local actors. A highly developed local social capital assumes, thus, a key role in driving RDP implementations, and, consequently, its funds' absorption. Our results provide clear evidence in this sense.

The importance of horizontal and vertical co-operation among local actors sharing production competences and working experiences is clearly stressed by the EU regulation as a way to create

mutual benefit for producers and consumers, and, consequently, for the whole rural economy.[22] A concrete example is the LEADER project financed in the region of *Centre-Val de Loire* in France. Financial assistance was provided to carry out inter-linked actions to expand the market share for local food products and strength the area's appeal as a high-quality enogastronomic tourism venue. The project started in 2008, and the final report stresses that the project underpinned core elements of local rural economy and established stronger connections between local agricultural tourism and food supply sectors.
Agricultural holdings receive support for participating in local producers' groups, especially in the case of high-quality schemes or typical productions, with the aim of passing on embedded competences, tacit-knowledge and historical traditions. During 2007-2013, the Second Pillar enhanced the existing collaboration between local wineries in *Catalonia's Barberà de la Conca* region, where the first Spanish cooperative winery was opened, over 100 years ago. Young wine companies are supported to get a foothold in the quality viticulture sector. Knowledge spill-over mechanisms have a temporal nature but, although the willingness to participate in specific programmes could be immediate, learning, competition and imitation are likely to exhibit longer-term effects. Our findings confirm the dynamicity of territorial identity in winegrowing regions, hence regions specialized in wine production result more capable of attracting RDP funds thanks to their social capital. In the case of the wine sector, the importance of local social capital can be explained not only in the perspective of thriving networks but especially under the light of the historical value of this production. For centuries Italy, France and Spain have been leaders in wine sector and, nowadays, wines are fully-fledged part of their cultures. This composition effect can be, at least partially, explained by the embeddedness, both social and environmental, of wine production. Diversification of investments, one of the EU priorities for rural development (Art. 5, Reg. 1305/2013), are more probable and effective in agricultural areas with outstanding landscapes, as vineyards. In these regions, agricultural productions have led the local economy for centuries and evoked deep and ancient relationship between man and environment. The case of Tuscany, leader in the Italian wine sector, is an evocative example (Vergamini et al., 2019). The diversification strategy can be more attractive for farmers in some regions than in others as cost and benefits from RDP can differ between regions and, type of farming in the same region. Under the predominant conception of endogenous development, increasing diversification has been promoted in order to accommodate various socio-economic systems and community lifestyles by enhancing local competences and actors' engagement (Galdeano-Gomez et al. 2011). Similarities in local competences help to generate collective actions oriented to reinforce local competitiveness and strengths in fields that are of interest for the entire local community.
Co-operation for the development of new products, processes and technologies in the agriculture and food sector becomes, therefore, crucial and, consequently, food traditions and high-quality agri-food systems are strongly supported.

The substitutive role of social capital is particularly important in regions with unfavourable economic conditions. In a framework of heterogeneous farms and regional disparities, the results show that the strengths of such non-official criteria seem to be limited and a cumulative effect towards more developed regions emerges. As literature has pointed out, social capital accounts is likely to more in

[22] Art. 35 of the EU Reg. 1305/2013 establishes that funds under RDP shall be granted in order to promote forms of co-operation (a), the creation of clusters and networks (b), the establishment of operational groups (c).

settings where formal institutions are lacking or poor. In this direction, our study demonstrates the structural bottleneck of not investing in social capital at the local level. It could deprive regional economies of a relevant part of economic funds, without which rural areas can hardly struggle to keep up with the rest of the EU. CAP supports are crucial to turn the contemporary political rhetoric on sustainability, inclusion and cohesion into practice, especially in rural areas. The financial supports received through CAP Pillars are, in fact, necessary boosting local economic activities in an era of globalization and supporting the sustainable transaction.

CONCLUSIONS

By focusing on local social capital as an expression of territorial identity, this article demonstrates the relevance of local social capital in driving the allocation of EU funds across regions and sectors. The overall analysis enables us to argue that investing in strengthening local social capital EU regions could have easier access to CAP funds for rural development programmes. The role of social capital is greater in less-development regions and if the region is specialized in specific sectors.

Regarding policy implications, the results bring forward strong evidence of the relevance of going beyond compensatory the social and territorial identity of European policies. Policies should go beyond compensatory or appeasement measures, but, conversely, tap into the socio-economic potential of each places. At local level, strong social capital and inter-personal linkages between economic actors is often more relevant than formal institutions and official allocation criteria, especially in more-developed areas or when production activities are strongly linked with historical traditions and habits.

APPENDIX

Annex A1: Proximity index specification

The proximity index PR_k is calculated as follows:

$$PRk = \frac{\sum_{i\in Tk}\sum_{j\in Tk, j\neq i} proximity\ i,j}{\sum_{i\in Tk}\sum_{j\in Tk, j\neq i} 1} \quad (5)$$

where *proximity* is defined as

$$proximityi,j = \min(P(RSi > 0|RSj > 0), P(RSj > 0|RSi > 0)) \quad (6)$$

and

$$P(RSi > 0|RSj > 0) = \frac{P(RSi > 0\ \wedge RSj > 0)}{P(RSj > 0)} \quad (7)$$

The last equation calculates how frequently a region is specialized in sector i given that it is specialized in sector j.

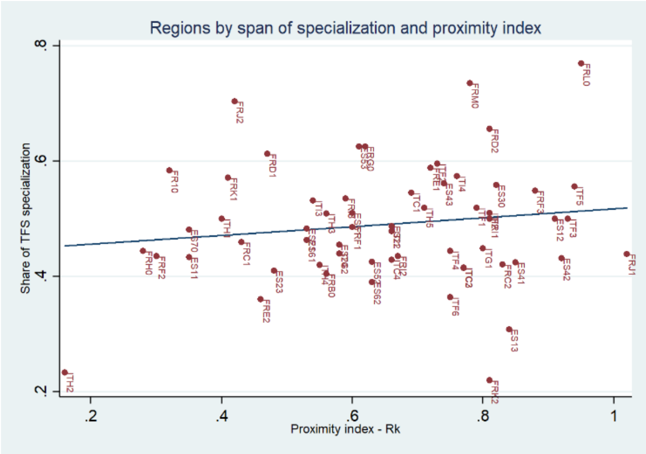
Table A1: Number of types of farming specialization and proximity index

NUTS2	Number of TF in which region is specialized (RS>1)	% of TF in which region is specialized	PR_k	NUTS2	Number of TF in which region is specialized (RS>1)	% of TF in which region is specialized	PR_k	NUTS2	Number of TF in which region is specialized (RS>1)	% of TF in which region is specialized	PR_k
ITC1	18	55%	0.69	FR10	14	58%	0.32	ES11	13	43%	0.35
ITC2	22	42%	0.77	FRB0	17	40%	0.56	ES12	8	50%	0.91
ITC3	17	41%	0.77	FRC1	17	46%	0.43	ES13	4	31%	0.84
ITC4	21	43%	0.66	FRC2	8	42%	0.83	ES21	14	48%	0.53
ITF1	27	52%	0.79	FRD1	19	61%	0.47	ES22	19	49%	0.66
ITF2	28	60%	0.73	FRD2	21	66%	0.81	ES23	16	41%	0.48
ITF3	26	50%	0.93	FRE1	20	59%	0.72	ES24	20	45%	0.58
ITF4	20	44%	0.75	FRE2	9	36%	0.46	ES30	19	56%	0.82
ITF5	25	56%	0.94	FRF1	17	49%	0.60	ES41	14	42%	0.85
ITF6	12	36%	0.75	FRF2	10	43%	0.30	ES42	19	43%	0.92
ITG1	22	45%	0.80	FRF3	17	55%	0.88	ES43	23	56%	0.74
ITG2	22	44%	0.58	FRG0	30	63%	0.62	ES51	25	51%	0.60
ITH1	16	50%	0.40	FRH0	16	44%	0.28	ES52	20	43%	0.63
ITH2	7	23%	0.16	FRI1	24	50%	0.81	ES53	25	63%	0.61
ITH3	27	51%	0.56	FRI2	20	43%	0.67	ES61	25	46%	0.53
ITH4	21	42%	0.55	FRI3	23	53%	0.59	ES62	16	39%	0.63
ITH5	28	52%	0.71	FRJ1	18	44%	1.02	ES70	13	48%	0.35
ITI1	22	48%	0.66	FRJ2	19	70%	0.42				
ITI2	25	51%	0.81	FRK1	16	57%	0.41				
ITI3	25	53%	0.54	FRK2	11	22%	0.81				
ITI4	31	57%	0.76	FRL0	30	77%	0.95				

	FRM0	25	74%	0.78	

Source: Authors' elaboration on FADN data

Figure A1: Number of type of farming in NUTS2 and proximity index



Source: Authors' elaboration on FADN data

Table A2: Regional CAP expenditure (in euro values, per farm)

CAP		Mean	Std. dev.	Min	Max
First Pillar	2010-2013	567.31	428.05	255.40	1055.33
Second Pillar	2010-2013	133.24	186.47	23.38	348.55
First Pillar	2014-2017	553.58	410.77	154.34	974.98
Second Pillar	2014-2017	148.97	95.58	63.59	252.24

Source: Authors' elaboration on FADN data

Table A4: Factors 'conditioning' the allocation of CAP expenditure

Agricultural			
Human capital	Total labour input- of holding expressed in annual work units (full-time person equivalents)	NUTS2-TF	FADN
Total output /ha	Total output from agricultural and livestock productions/UAA	NUTS2-TF	FADN
Farm gross value added/ha	Farm gross value added/UAA	NUTS2-TF	FADN
Physical dimension	Number of farms specialized in i in region k/ regional UAA	NUTS2-TF	FADN
Regional			
Population density	Absolute value of the average population per square kilometres	NUTS2	EUROSTAT
Employment rate	Employed people / total labour force	NUTS2	EUROSTAT
Employment rate Non-EU28	Employed of Non-EU28 people / total labour force	NUTS2	EUROSTAT
Commuting	Thousands of employed people commuting in the same region	NUTS2	EUROSTAT
Regional agriculture	Gross value added at basic prices	NUTS2	EUROSTAT
Transport infrastructure	Factor obtained by the Principal Component Analysis of: Road (Km) Motorway (Km) Railway (Km)	NUTS2	EUROSTAT
Agricultural regional diversification	Number of sectors in which that region is specialized	NUTS2	FADN
Regional Second/First Pillar average	Regional average of funds	NUTS2	FADN
Regional spatial lag	Average amount of funds allocated in neighbouring regional	NUTS2	Authors' elaboration

Table A5: Descriptive statistics – model variables

Variable	**Mean**	**Sd**	**Max**	**Min**

First Pillar/farm	41.50	68.15	0	1199.67
Second Pillar/farm	8.14	23.83	0	1067.41
First Pillar pp/farm 1	41.00	64.42	0	884.38
Second Pillar pp/farm 1	9.24	25.91	0	1068.84
Agricultural				
Human capital	1965.83	3954.32	0.06	129552
Farm production value /ha	28872.01	111480.70	0	4772220
Farm net value added/ha	12036.32	48168.74	-66636.6	257412
Physical dimension	11.73	34.84	0	1051
Regional				
Population density	165.00	150.98	25.686	1006.83
Elderly population density	0.10	.018	0.06	0.16
Employment rate	60.81	8.55	35.70	86.40
Employment rate Non-EU28	54.24	9.79	26.10	71.80
Commuting	1129.60	981.17	52.40	5217.50
Regional agriculture	1538.56	1393.50	39.39	10477.59
Road	24720.0	24166.80	642	95136
Motorway	603.69	524.49	0	2610
Railway	1075.40	657.02	0	2661
Agricultural regional diversification	17.76	5.24	1	31
Second Pillar regional average	4337.91	5784.3	0	45735.6
Frist Pillar regional average	14669.6	10909.1	745.7	51399.3
Second Pillar regional spatial lag	2964.2	3013.4	0	13075.4
Frist Pillar regional spatial lag	12122.5	10774.7	0	48734.7

(1) Average over programming period

Source: Authors' elaboration on FADN and EUROSTAT data

Table A6: Local social capital on Second Pillar absorption- Variables estimations

	FE				GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local social capital	1.463***	1.462***	1.504***	1.490***	1.765***	1.788***	1.636**	1.619**
	(0.460)	(0.464)	(0.520)	(0.527)	(0.697)	(0.697)	(0.770)	(0.770)
IIPillar (t-1)	0.109	0.109	0.095	0.092	0.051	0.052	0.061	0.063
	(0.102)	(0.102)	(0.102)	(0.102)	(0.059)	(0.059)	(0.055)	(0.054)
IPillar	0.042*	0.042*	0.036**	0.035**	0.040***	0.040***	0.040**	0.041**
	(0.022)	(0.021)	(0.017)	(0.018)	(0.015)	(0.015)	(0.015)	(0.015)
IIPillar regional average	0.00***	0.00***	0.00***	0.00***	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Human capital		0.00	0.00	0.00		-0.00	-0.00	-0.00
		(0.000)	(0.000)	(0.000)		(0.00)	(0.00)	(0.00)
Total output /ha		0.00***	0.00**	0.00**		-0.00	0.00	0.00
		(0.000)	(0.000)	(0.000)		(0.00)	(0.00)	(0.00)
Farm gross value added/ha		-0.00***	-0.00*	-0.00**		0.00	-0.00	-0.00
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.000)
Physical dimension		0.002	0.005	0.005		0.003	0.003	0.003
		(0.010)	(0.010)	(0.010)		(0.009)	(0.012)	(0.010)
Population density			0.047	0.070			0.218*	0.222*
			(0.107)	(0.115)			(0.158)	(0.158)
Employment rate			-0.024	-0.065			-0.027	-0.029

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			(0.101)	(0.101)			(0.065)	(0.065)
Employment rate Non-EU28			-0.139***	-0.094			-0.252***	-0.254***
			(0.063)	(0.064)			(0.027)	(0.027)
Commuting			-0.007	-0.008			-0.003	-0.003
			(0.007)	(0.008)			(0.006)	(0.006)
Infrastructure			-19.467*	-19.36***			-3.666	-3.851
			(9.949)	(9.334)			(3.688)	(3.745)
Regional agriculture (GVA)			0.001	0.001			0.00	0.00
			(0.001)	(0.001)			(0.001)	(0.001)
Agricultural regional diversification			-0.067	-0.091			-0.142	-0.137
			(0.163)	(0.170)			(0.119)	(0.119)
Regional spatial lag				0.00***				0.00
				(0.00)				(0.00)
Year dummies	✓	✓	✓	✓				
CAP programming periods	✓	✓	✓	✓				
Time lagged LSC (0/3)	✓	✓	✓	✓				
Observations	6610	6533	6225	6225	4985	4909	4248	4248
Groups	1583	1573	1525	1525	1410	1392	1319	1319

Source: Authors' elaboration

Note: Robust (cluster at NUTS2 level) standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except First Pillar. In FE, time, regional and sectorial fixed effects are included. In GMM estimation all suitable lags were used as GMM-type instruments, while the first difference of all the exogenous variables were used as standard instruments. Test for multicollinearity and goodness of fit have been performed.

Table A7: Local social capital on First Pillar absorption -Variables estimations

	FE				GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local social capital	0.865	0.798	1.763	1.761	0.198	-0.010	0.539	0.537
	(1.938)	(1.942)	(1.761)	(1.759)	(1.339)	(1.315)	(1.246)	(1.247)
IPillar (t-1)	0.356***	0.353***	0.350***	0.350***	0.021	-0.031	-0.122	-0.122
	(0.053)	(0.051)	(0.054)	(0.054)	(0.162)	(0.200)	(0.233)	(0.234)
								(0.202)
IIPillar	0.148***	0.147***	0.133***	0.132***	0.066	0.061	0.109***	0.109***
	(0.057)	(0.056)	(0.052)	(0.052)	(0.046)	(0.046)	(0.42)	(0.42)
IPillar regional average	0.00***	0.00***	0.00***	0.00***	0.00	0.00	0.00	0.00
	(0.000)	(0.000)	(0.000)	(0.000)	(0.00)	(0.00)	(0.00)	(0.00)
Human capital		0.00	0.00	0.00		0.00	0.00	0.00
		(0.000)	(0.000)	(0.000)		(0.00)	(0.00)	(0.0)
Total output /ha		-0.00	-0.00	-0.000		-0.00	-0.00	-0.00
		(0.000)	(0.000)	(0.000)		(0.00)	(0.000)	(0.000)
Farm gross value added/ha		0.00	-0.00	-0.00		0.00	0.00	0.00
		(0.000)	(0.000)	(0.000)		(0.00)	(0.00)	(0.00)
Physical dimension		-0.069**	-0.067***	-0.067***		-0.623	-0.333	-0.333
		(0.028)	(0.217)	(0.030)		(0.054)	(0.060)	(0.060)
Population density			-0.264	-0.251			-0.340	-0.344
			(0.217)	(0.221)			(0.288)	(0.242)
Employment rate			0.117	0.114			0.043	0.043
			(0.085)	(0.086			(0.085)	(0.084)
Employment rate Non-EU28			0.084	0.083			-0.001	0.215***
			(0.067)	(0.0669)			(0.009)	(0.069)

Commuting			0.012 (0.014)	0.012 (0.013)			-0.001 (0.009)	-0.001 (0.010)
Infrastructure			15.242* (7.828)	14.946* (8.137)			24.060 (8.807)	24.109 (8.594)
Regional agriculture (GVA)			-0.00 (0.002)	-0.00 (0.002)			0.004*** (0.001)	0.004*** (0.001)
Agricultural regional diversification			-0.314 (0.209)	-0.313 (0.209)			-0.512** (0.132)	-0.511*** (0.130)
Regional spatial lag				0.00 (0.00)				0.00 (0.00)
Year dummies	✓	✓	✓	✓				
CAP programming periods	✓	✓	✓	✓				
Time lagged LSC (0/3)	✓	✓	✓	✓				
Observations	6824	6747	6431	6431	5079	5033	4339	4339
Groups	1647	1637	1588	1588	1451	1433	1359	1359

Source: Authors' elaboration

Note: Robust (cluster at NUTS2 level) standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1. All explanatory variables are lagged 1 year, except Second Pillar. In FE, time, regional and sectorial fixed effects are included. In GMM estimation all suitable lags were used as GMM-type instruments, while the first difference of all the exogenous variables were used as standard instruments. Test for multicollinearity and goodness of fit have been performed.

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