Old wine in new wineskins? Understanding the cooperative movement: Catalonia, 1860-1939

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Different factors have been proposed to explain why in some regions there is a greater tendency to form cooperatives. The debate remains open. In this study, we look at the spread of cooperativism within Catalonia from 1860 to 1939. Catalonia was not just the leading industrial region in Spain, but also where cooperatives first emerged and had a greater presence. In line with the existing evidence, we find that cooperativism spread from coastal municipalities to the hinterland. In particular, it seems that local conditions (literacy and social capital) facilitated this process, while accessibility to the transport network and neighbouring effects also played a significant role.

1. Introduction

In 1995 the United Nations (UN) declared July 1, as the *International Day of Cooperatives*. Likewise, 2012 was proclaimed the *International Year of Cooperatives*. The UN has stressed the importance of the social economy, and hence cooperativism, as a democratic alternative to capital-based societies, and has argued that they are a crucial tool in the struggle against poverty and inequality.[1] Notwithstanding the potential benefits of cooperatives, it is far from clear why some regions appear to exhibit a greater tendency towards cooperation, and collective action.

In economic history, several studies have recently explored the formation and development of cooperatives, broadly defined as organisations where profits or benefits are shared by their members (Henriksen et al. 2012; Beltrán 2012; Martínez-Soto et al. 2012; Garrido 2014, 2020; Fernández 2014a; Fernández and Simpson 2017; Watts 2017; among others). Yet, little attention has been paid to the spatial dimension which, in turn, raises a relevant question. If cooperatives reflect a greater desire to cooperate but they are unevenly distributed across space, then a better understanding of the spatial dimension could shed further light on the whole subject.

Traditionally, the spread of cooperativism has been regarded as a direct outcome of industrialisation and urbanisation. During the 19th century, cooperatives emerged, first in urban contexts and then in rural ones, as a mechanism to cushion workers from adverse conditions originating in a market economy. In general, consumers' cooperatives aimed at improving the living conditions of their members (usually industrial workers or craftsmen) by the distribution of consumer goods and services such as social protection and education. Although some were established in rural environments, the majority were located in urban agglomerations. Producer cooperatives, however, permitted the sharing of resources and risk. Within the latter, agricultural cooperatives were especially important in Spain, since they focused on the transformation and commercialization of agricultural products produced by their members, as well as on the supply of agricultural inputs. It was also common for them to provide credit and, occasionally, consumer goods for their members. Besides, agricultural cooperatives used to be located in rural areas, although they also had a presence in cities.

Historical studies have claimed that the early development of agricultural cooperatives is related to property (land) structure, human capital, market access, as well as institutions and product specialisation (Henriksen 1999; Simpson 2000; O'Rourke 2007a, 2007b; Garrido 2007, 2020; Martínez-Soto et al. 2012; Fernández 2014b; Fernández and Simpson 2017). Likewise, these and other studies have investigated the implications of trust and social capital (Galassi 1999; Beltrán 2012; Fernández 2014a; Garrido 2014).

Certainly, the existence of social networks and trust-based interpersonal relations is crucial in the emergence and development of cooperatives. Social capital might reduce the transaction costs of collective action, and limit free-riding (Ward 1958; Vanek 1970). Also, greater social capital facilitates decision-making, the resolution of conflict and the management of common-pool resources (Putnam 1993; Ostrom 1990, 2000; Svendsen and Svendsen 2004). Still, this approach has been criticised because of its ambiguity and immeasurability (Sobel 2002). Even more, some studies have argued that social capital alone does not explain the development of cooperatives (Henriksen 1999; Henriksen et al. 2012; Henriksen and O'Rourke 2005; Garrido 2014).

Therefore, the aim of this study is to present further evidence to better understand why in some regions the propensity to cooperate is greater than in others. In doing so, we will contribute to the existing debate by exploring the cooperative movement in Catalonia between 1860 and 1939. For this purpose, we have compiled a novel dataset with information on the whole population of cooperatives. In order to examine the spatial dimension, the unit of analysis will be the municipality. Besides, the period under study comprises the genesis of cooperativism, not only in Catalonia, but in Spain and Europe. In sum, we delve further into the subject considering all types of cooperatives, and not just agrarian cooperatives, and using municipalities, instead of districts or provinces, as the unit of analysis.

In line with the literature, this approach will assess the extent to which social capital, captured with a set of distinct and novel variables, human capital and accessibility, among other factors, account for the spread of cooperatives in Catalonia. However, in contrast to previous studies, our dataset will allow us to study the relevance of each of these forces simultaneously.

Generally speaking, our findings suggest that local conditions were a fundamental factor, yet not the only one, in explaining the greater or lesser propensity to cooperate. The spread of cooperativism in Catalonia essentially occurred from the coast to the interior, and from the urban to the rural world. Therefore, distance to cities, access to communication networks and neighbouring spillover effects also played a relevant role. Notwithstanding this, it seems that a new form of organization (new wineskins) spread more rapidly when local conditions (social and human capital) existed before (old wine).

2. Historical background

Conventionally, cooperativism has been regarded as a response to industrialisation and urbanisation within the so-called, *social question* debate (Thompson 1963; Wrigley 1990). Growing social tensions in response to poverty and deprivation prompted the formation of cooperatives. These organisations included consumers' cooperatives, whose aim was to facilitate access to basic goods (food, clothing), but also educational, welfare, recreational and cultural services. Although early cooperatives shared profits among their members, they also created libraries, theatres, nurseries and cafes, and offered temporary assistance schemes to help members overcome contingencies such as illness, disability, or unemployment.

In Europe, cooperativism developed at different paces. After the foundation of the first consumers' cooperative (*The Rochdale Equitable Pioneers Society)* near Manchester in 1844, numerous enterprises were created in Great Britain. Reformist bourgeoisie played a central role, since cooperation became a reasonable answer to the *social question* debate. In this way, workers pooled resources and effort in order to offset low salaries; an uneven distribution of wealth; vulnerability of working-class families to unemployment, old age, work-place accidents and widowhood; precarious educational infrastructures; and, poor hygiene in the burgeoning urban centres.

Consumers' cooperatives proliferated in the late 19th century, when they were adopted by the labour movement.[2] Cooperativism rapidly spread in the early 20th century, especially after the

outbreak of World War I (WWI). Falling material living standards resulting from rising prices stimulated further cooperation in urban settings (Brazda and Schediwy 1989, pp. 14-16). In rural contexts, cooperativism expanded in the late 19th and early 20th century- The transition from a subsistence traditional agriculture to a market-oriented one brought about greater competition in some European countries, and hence falling prices, setting the ground for the development of agricultural cooperatives (Federico 2005).

In Spain, cooperativism arrived late and expanded slowly, compared with other European countries. The available sources presents major and well-known problems, which hinder quantitative analyses (Garrido 1996). Notwithstanding this limitation, this sources allow for a general analysis of the scope and development of the phenomenon.

The earliest cooperatives were founded in the coastal and metropolitan areas of Catalonia in the 1860s (Medina-Albaladejo and Pujol-Andreu 2014; Medina-Albaladejo 2017). At the onset of World War I (WWI), urban cooperatives sprang around the most industrialised and urban areas.[3] In 1908, 41.8% of all Spanish cooperatives were based in Catalonia. Seven years later, this proportion had decreased to 29.3%, with some regions such as the Basque Country, Valencia and Asturias witnessing a substantial increase. Before WWI, the social impact of consumers' cooperatives barely reached 1% of the Spanish population, compared to 10% in the industrial districts of Catalonia in 1915.[4] Catalonia was, therefore, on a par with countries such as Switzerland (13.8% in 1910); Finland (11.9%); Germany (9.5%); Sweden (6.9%) and Italy (8.8%), but it was still far below the United Kingdom and Austria (Medina-Albaladejo and Pujol-Andreu 2014). In Catalonia, the popularity of cooperativism continued in the following decades, as illustrated by Map 1. In 1933, 33.8% of non-agrarian cooperatives were in Catalonia (especially Barcelona), which was the most important region in this regard alongside the Basque Country (Instituto Nacional de Estadística 1934).

MAP 1

MAP 2

Although agrarian cooperatives emerged later than urban cooperatives (consumers, producers), they were later to become the most frequent type, yet less common than in other European countries (Fernández 2014a, p. 686). In 1907, there were 433 agrarian cooperatives, and by 1915 there were 1,530 (Garrido 1996). By 1923, the number of these societies had soared to over 5,000, with a total of nearly 400,000 members (Ministerio de Fomento 1923), that is, around 12% of the agricultural population (Beltrán 2012, p. 512). These figures remained stable until the beginning of the Civil War in 1936. In Catalonia, however, agrarian cooperatives rapidly spread, but they were not as predominant as in other regions (Map 2). In 1933, there were 540 agrarian cooperatives in Catalonia (12.7% of a total of 4,266), second only to Castile and León (Ministerio de Agricultura 1934). Therefore, our study examines cooperativism in Catalonia, a region where cooperativism developed earliest and cooperatives have a more relevant presence.

3. Literature review

Over the last few decades, the historical study of cooperatives has revolved mainly around three debates. First, the formation and development process, especially as regards to the main motivations to form a cooperative. Second, the organisation and governance of these enterprises. In this line of research, studies have explored several dimensions such as their performance in a market economy. Third, the socioeconomic impact of cooperatives with respect to the standard of living of their members, both in rural and urban contexts. The latter has also paid attention to the modernisation, and profitability, of the agrarian sector.

Despite the scope and historical relevance of cooperatives, it remains unclear why in some regions cooperatives spread rapidly while in others did not. This is more acute as regards to consumers' cooperatives. In a way, the existing literature has approached this subject from a purely social or business history perspective. For example, studies have looked at specific dimensions such as the relationship of cooperatives with the market, trade unions and social-democrat political parties (Purvis 1998; Gurney 2012); organisational issues, including internal

conflict and the cooperatives' lack of flexibility to adapt to conditions of changing demand (Gurney 2012; Toms 2012); the role played by wholesale cooperative societies (Black and Robertson 2009; Webster 2012; Wilson et al. 2013a, 2013b); the social impact of cooperatives in the economic, financial, healthcare, educational and residential conditions of their members (Robertson 2010, 2012; Samy 2012; Jackson 2016; Watts 2017); the distribution of basic products among members (Schollier 1999; Medina-Albaladejo and Pujol-Andreu 2014); the role of cooperatives in the modernisation of food distribution chains in the second half of the 20th century; and, the competitiveness of cooperatives compared to capitalist firms (including case-studies which reflect both the success and the failure of cooperatives) (Zamagni et al. 2004; Alexander 2008; Shaw and Alexander 2008; Menzani and Zamagni 2009; Hilson 2011, 2013; Ekberg 2012a 2012b; Friberg et al. 2012; Kramper 2012; Balnave and Patmore 2012, 2015; Battilani and Zamagni 2012; Menzani and Medina-Albaladejo 2018; Garrido 2019).

More specifically, it is worth stressing the publication of several studies, essentially based on agricultural cooperatives, that have revitalised research and discussion. Ingrid Henriksen and coauthors, for instance, have pointed to the importance of social capital in rural Denmark, considering this as the crux of the matter in the successful development of agricultural cooperatives (Henriksen 1999; Henriksen et al. 2011, 2012; Henriksen and O'Rourke 2005). These studies, however, do not neglect the potential role played by other relevant aspects. Likewise, Kevin O'Rourke (2007a, 2007b), Peter Van der Hallen (2009) and Francesco Galassi (1999) consider that the failure of dairy cooperatives in Ireland and Belgium and rural credit cooperatives in southern Italy can be largely explained by a lack of social cohesion.

Timothy Guinnane (2001) suggests that the successful performance of rural credit cooperatives in Germany was based on dense social relations, which allowed to monitor customers and enforce sanctions, and also opening credit lines to low-income social groups. Eva Fernández (2014a), on the other hand, emphasises the role played by cultural and religious factors in generating trust and thus social capital, claiming that cooperativism was especially successful in protestant societies.

In Spain, most studies have a limited scope. Moreover, urban cooperatives (consumers', producer), despite of their earlier development, have received little attention. Having said that, Francisco Beltrán (2012), using information at the province-level, found that the existence (or pre-existing) stock of social capital mattered for the emergence of agrarian cooperatives during the 20th century. In brief, provinces where agrarian cooperatives and trade unions developed earlier were those in which there was previous experience in the management of common-pool resources. These pre-existing relationships contributed to the formation of social networks that further facilitated the circulation of information and interpersonal relationships. Ángel Pascual Martínez-Soto, Susana Martínez-Rodríguez and Ildefonso Méndez (2012), however, stress the detrimental effect of male illiteracy on the formation of rural credit cooperatives. According to them, the key factors for cooperation are both formal education and social capital. Samuel Garrido (2014), however, argues that social capital does not necessarily lead to the emergence of cooperatives, as shown by the citrus-growing cooperatives in eastern Spain. In fact, it has been recently suggested that wine cooperatives emerged in (a part of) Catalonia as a result of the unequal distribution of land and the ensuing political and social conflics (Garrido, 2020).

The role played by institutions is also an important aspect. From a theoretical perspective, some authors have argued that cooperatives, which often suffer financial problems owing to low investment and weak capitalisation – mainly caused by a risk-averse membership – need support structures created by the State and other institutions in order to survive (Vanek 1970; Ben-Ner 1988; Hansmann 1996; among others). A large number of case studies have emphasised this as a cause of the success or failure of French, Italian, Spanish, Dutch and Danish agrarian cooperatives (Garrido 1996, 1997; Simpson 2000; Simpson and Carmona 2017; Chevet 2009; Henriksen et al. 2012; Planas 2013, 2016; Medina-Albaladejo 2015; Planas and Medina-Albaladejo 2017; Medina-Albaladejo and Menzani 2017; Fernández and Simpson 2017; Molema 2017). Finally, the development of digital tools, such as GIS, have permitted the inclusion of detailed geographic data in historical studies which, in turn, opens up new lines of research (Martí-Henneberg, 2011).

4. Data and methodology

4.1 Data and sources

In order to study the spread of cooperativism in Catalonia, we build a novel dataset with information at the municipality-level (N=1,061) for 7 periods (1860-1876; 1877-1886; 1887-1899; 1900-1909; 1910-1919; 1920-1929; 1930-1939).[5] Regarding cooperatives, the main source is the *Aproximació a l'atlas cooperatiu de Catalunya fins 1936* (Celada 1989), that compiled information on cooperatives in Catalonia from 1860 to 1939.[6] In particular, this source provides the name and nature of the cooperative (agrarian, consumers, producers, credit, housing, health care, energy, etc),[7] the municipality where it was created, the year of foundation (and dissolution), and the earliest and latest archival records available. A fundamental issue with this dataset is consistency. Of a total sample of 2,103 cooperatives, the year of foundation is provided only for 803 (38.2%). As a result, we rely on the information on the earliest record found to fill in the gaps. In short, only in 10 cases out of 803 (1.24%) the year of foundation differs from the year of the earliest archival record, thereby suggesting that our proxy is a reliable indicator of the *entry year*. In sum, this source reports the population of cooperatives, that is to say, all cooperatives created between 1860 and 1939.

That said, it is worth mentioning that the choice of the period of study (1860-1938) is no ad-hoc, as during this period the creation of cooperatives was not subject to a central authority. Afterwads, with the triumph of Francoism, these associations were forcefully integrated into the corporatist structure of the regime, and therefore the creation of cooperatives was no longer spontaneous but a State-driven process (Medina-Albaladejo 2015; Medina-Albaladejo and Menzani 2017; Planas and Medina-Albaladejo 2017). Furthermore, Garrido (1996, 2007) points that agrarian cooperatives did not just result from a voluntary desire to share resources and risks. Catholic activism stimulated the development of "fictitious" associations to disseminate anti-socialist propaganda. Of the 870 agrarian cooperatives, only 148 (17%) have been identified though not removed from the dataset because there is no documentary proof that any of them was

one of those "fictitious" cooperatives. This problem does not invalidate the analysis, but it must nevertheless be taken into consideration.

Table 1 briefly describes our sample. Although Rafael Celada (1989) provides a total of 2,235 cooperatives, there are several duplicates that have been removed. For example, some associations are mentioned in more than one record, but with slight changes in their name, leading them to be regarded as two different entities. In other cases, the cooperative changed its name, or was disbanded only to be reorganised at a later date. After removing duplicates and those with missing information we come up with a total of 2,093. Of these, 870 (41.6%) had an agrarian nature and 1,223 (58.4%) were non agrarian (urban); within the latter group, consumers' (38.8%) and production cooperatives (11.7%) predominated.[8] Actually, neither all agrarian cooperatives were in rural contexts, nor all consumers' and production ones were in urban centres. Still, this approach is a good approximation since only 9.9% of the agrarian cooperatives were established in municipalities with more than 10,000 inhabitants in 1900.[9]

TABLE 1

Figure 1 illustrates the creation of cooperatives in Catalonia during our period of analysis. In general, there seems to be two major waves. First, cooperativism intensified between the late 19th century and 1920, especially during World War One (WWI). This, in turn, mirrors developments in the rest of Europe. The *social question* debate reached its peak in the early 20th-century. Besides, the scarcity and inflation brought about by the war led to the deterioration of living standards and stimulated the creation of cooperatives (Brazda and Schediwy 1989, p. 17). This pattern affected both urban and rural (or agrarian) contexts, although urban cooperatives had preceded agrarian ones. This early wave came to halt in the 1920s, a decade characterised by the consolidation of cooperatives founded in the previous years, rather than by the creation of new ones. Then, the second wave took place during the 1930s, in a context of economic crisis and the proclamation of the Second Republic (1931-39), a period during which left-wing political parties and trade unions held substantial power and stimulated the development of cooperatives.[10]

FIGURE 1

Similarly, map 3 illustrates municipalities in which at least one cooperative was created between 1860-1877, 1860-1910 and 1860-1939. On the whole, map 3 suggests that the spread of cooperativism went from the coastal and metropolitan areas of Gerona and Barcelona to the hinterlands of Catalonia. More specifically, it shows that, by 1939, at least one cooperative had been formed in great part of the territory. Interestingly, the province of Lérida is where cooperativism, on the whole, was less prevalent.

MAP 3

4.2 Methodology

Our aim is to assess the impact of different variables as suggetsted by the literature on the probability that at least one cooperative will be established in a given municipality during a given period. Hence, our outcome variable, related to the appearance of at least a new cooperative, is a binary indicator. This implies a limited dependent variable approach extended to panel form to take advantage of the time dimension in the data. Specifically, we use a random effect probit[11] model, which is expressed by the following equation:

$$\mathrm{P}(Y_{it} = 1|X_{it},\ Z_i) = \Phi(X_{it}\gamma + \mathrm{Z_i}\delta + c_i) \qquad (1)$$

where Y_{it} takes the value of 1 if at least one cooperative is formed in municipality i during period t, and 0 otherwise. X_{it} is a vector of observable characteristics for each municipality i in period t, while Z_i is a vector of observable time-invariant characteristics for each municipality, c_i captures non-observable heterogeneity, while Φ is the normal distribution function. Our model thus examines the extent to which different factors, suggested by previous literature, influence

the likelihood that a new cooperative is formed in a particular muncipality. That is to say, we investigate the spread of cooperativism within the territory of Catalonia between 1860 and 1939.

The vectors of observable characteristics X_{it} and Z_i comprise several dimensions. First, we control for a set of *local geo-economic conditions*. These are population density (*Popden*), illiteracy (*Illiteracy*), altitude (*Altitude*) and wealth per capita (*Wealth*). As the vast majority of cooperative-members were males, these variables only include men.[12] Table A1 in the appendix provide the definitions and sources of all variables used in the empirical analysis.

Our *a priori*, regarding *local conditions*, considers that densely populated areas are conducive to the dissemination of information while large markets attract investment. In this regard, we expect a positive association between population density and the surge of cooperatives. In contrast, illiteracy is detrimental to the adoption of a novelty. Moreover, reading and writing was essential to actively participate in the development and management of a cooperative (Henriksen 1999; Svendsen and Svendsen 2004; Martínez-Soto et al. 2012). Regarding altitude, we expect it to be negatively associated to the cooperitave movement. This is because altitude captures accesibility, especially in Catalonia where coastal municipalities are more accessible than the hinterland. Finally, we expect a negative association with wealth. In a way, a larger concentration of wealth and greater inequality is expected in wealthier municipalities. This, in turn, might discourage cooperation, especially in agrarian settings (Simpson 2000; Garrido 1996, 2007), because cooperatives were mainly joined by industrial workers, artisans (consumers' and production cooperatives) and small-and-medium landholders (agrarian cooperatives). Large businessmen, merchants or landowners had neither the incentive nor the need to cooperate to improve their access to basic products or to obtain better prices for their products in the markets, where they were in a strong bargaining position.

Beyond the set of factors reflecting local conditions, we also empirically assess variables related to the dissemination of information. In doing so, we examine whether the walking distance from a municipality to the capital-city of Barcelona (*Hours to Barcelona*) matters. Barcelona stands as the principal urban agglomeration and maritime harbour. Besides, cooperatives developed there sooner and more rapidly. Additionally, our approach controls for the distance (in

kilometres) from each municipality to the railway network (*Distance to railway*) during each period. The railway not only transformed the landscape but it improved communications, facilitating the movement of people, goods and ideas.

Regarding neighbouring effects, we estimate the effect of the adoption of the cooperative movement by neighboring municipalities using the model described above modified by a distance-weighted spatial lag term (*Peer-effect*).

$$\mathrm{P}\left(Y_{it}=1\middle|X_{it},\ Z_i, Y_{jt-1}\right)=\Phi(\rho\sum_{j=1}^{J}\omega_{ij}Y_{jt-1}+X_{it}\gamma+\mathrm{Z_i}\delta+c_i) \qquad (2)$$

Specifically, we assume the spatial weights in the location-to-location weight matrix, W, decrease with distance, so that neighboring municipalities are modelled to exert spatial dependence as a decreasing function of the geographical distance between them (Anselin, 1988). More specifically, the weights ω_{ij} are based on the row-normalized matrix of the inverse geodesic distance between the centroids of municipalities *i* and *j*.

The use of a spatial lag model appears most compatible with common notions of diffusion as it implies an influence of neighbors' cooperative adoption that is not simply an artifact of unmeasured independent variables as in the case of a spatial error model. Furthermore, to attenuate the simultaneity bias in the spatial process, we lag the peer-effect one period to capture the behavior of neighboring municipalities in the previous period, a chronology that suits with the causal logic of diffusion, reflecting that spatial diffusion of knowledge is not an immediate processes (Elkins et al. 2006)[13]. Finally, as robustness, we construct different weighting matrices: i) considering the 5 nearest neighbours, ii) using a cut-off of 20 km, and iii) using a cut-off of 60 km (which is the average distance between any two locations in the sample).

Finally, our empirical analysis also controls for social capital. Following Beltrán (2012) and Garrido (2014), we first use information on the existence of common-pool resources (*Commons*) and irrigation systems (*Irrigation system*) managed by collective institutions, such local communities in the late 19th and early 20th centuries. The data are novel since they have been

built down to municipal level from various sources (see Table A1 in the appendix). That said, it is worth stressing the difficulty of measuring social capital. The evidence on commons presents several issues. For instance, it relates to a period following processes of disentailment throughout the 19th century. In addition, using the presence of communal property as a measure of social capital is riddled with other problems that must not be ignored, especially in Catalonia. Commons included in the public-property registers was not necessarily free to use, as local oligarchies might have secured privileged access to the resource. That is, not all common land was publicly available. Conversely, some privately-owned land might have been publicly available for certain uses. The catalogue of common rural land of 1901 (Instituto Nacional para la Conservación de la Naturaleza 1993) includes some examples of State- or privately-owned land, the use of which was open to the community, and it is very likely that more examples exist.[14] The lack of visibility of these communal practices, which involved the exercising of traditional rights not supported by documents, is related to the evolution of property rights over time. As argued by Rosa Congost, Monserrat Pellicer and Lluís Serrano among others, from the 18th century onwards the Real Audiencia authorised the enclosure of common land in favour of the emerging elites, leading to the reduction and even the suppression of collective rights; this process of land appropriation had to face the opposition of local communities (Bosch eet al. 1999; Congost 2007; Pellicer 2007; Serrano 2016). At any rate, the absence of references to publicly-owned land in Catalonian municipalities does not mean that some resources were not exploited collectively. As such, it is likely that communal property existed that is not expressed in the record.

Additionally, we have also included a variable to capture the preexisting stock of social capital, guilds. Common-pool resources and irrigation systems reasonably captured social capital in rural contexts, but this could not be the case for urban centres. All in all, the presence of guilds, common-pool resources and irrigation systems are included to capture preexisting social capital, or trust and norms of reciprocity; networks and forms of civil participation; formal and informal rules and institutions, following Ostrom and Ahn (2003).

We complement the above information with other indicators, such as the type of jurisdiction (royal, secular lordship or ecclesiastical lordship). Royal jurisdictions or

municipalities where land belonged to the Crown were less likely to privatise; to pass from public to private hands. While the jurisdiction of a secular or ecclesiastical lord did not necessarily lead to private appropriation, the claim of the *Real Audiencia de Cataluña* (Royal Audience of Catalonia) ("No land without lord", rather than "No lord without deed") played to the advantage of lords, both under ecclesiastical (for example in Cerviá de Ter, as analysed by Congost) and aristocratic jurisdictions. This drove the land into the hands of lords, regardless of whether communal rights applied (Congost 2000, 2002). In short, it is expected that land in municipalities under secular or ecclesiastical lordships was more prone to become private property, thereby reducing one of the social capital mechanisms of the *Ancient Régime*.

TABLE 2

In addition, we consider the criminal (*Crc_1859*) and civil cases (*Cic_1866*). It is assumed that areas with less conflict had more social capital (Fernández 2014a). All variables are defined at the municipality-level except these last two, which offer information at the district-level.

Table 2 illustrates the descriptive statistics of the explanatory variables. That said, we will first use the whole sample, using all types of cooperatives, and then we will split the sample into agrarian and non-agrarian, namely urban cooperatives, given that the drivers might be different.

5. Results and discussion

Table 3 presents the econometric results for different specifications of equations (1) and (2). Alongside the average marginal effects, the table presents standard errors clustered at the municipality-level. The estimated marginal values represent the effect of an infinitesimal change in the explanatory variable on the probability that in a municipality at least a new cooperative emerged during one time-period. In addition to the variables described above, all specifications, although not reported, include dummies for province and census-periods. The former captures

specific effects affecting all municipalities that belong to the same province, and the latter try to capture cyclical shocks affecting all municipalities within the same time period.

TABLE 3

Model 1 estimates the effect of local conditions on the probability that at least one cooperative is created in a municipality in a given period. High population densities, high literacy rates and lower altitudes increase the probability of cooperatives being created. Conversely, higher wealth per capita decreases the probability of cooperatives being founded.

Model 2 considers knowledge dissemination-related variables in addition to local conditions. The nearer municipalities are to either Barcelona or the railway network (which expanded substantially during the period under consideration), the more likely they are to witness the foundation of a cooperative. Model 3 also incorporates the spatial lag peer-effect. It is interesting to assess whether the creation of cooperatives in neighboring municipalities during a given period increases the probability of cooperatives being created in the focal municipality in the following period. The results of Model 3 show that the peer-spillover effect played a significant part in the dissemination of cooperativism, suggesting the existence of spatial dependence.

Model 4 also incorporates the effect of social capital on the geographical diffusion of cooperatives in Catalonia. Of the six social capital-related variables, three are statistically significant: the presence of guilds and irrigation systems managed by collective institutions (such as irrigator communities of the late 19th and the early 20th century) increases the probability of cooperatives being created. Conversely, a high number of civil legal cases in a given municipality decreases the probability of cooperatives being created. However, the presence of communal land in the municipality, the applicable jurisdiction in the municipality and the number of criminal cases have no significant impact on the probability of cooperativism.

As robustness checks, we first re-estimate our equations taking into account potential biases. First, there may still be an issue of concern if the independent variables are correlated with

the unobserved time-invariant individual effects. If such a correlation exists, the estimated coefficients are biased. To deal with this problem, Model 5 uses the correlated random-effects approach developed by Wooldridge (2005) in combination with Blundell et al. (1999); also known as the pseudo-fixed effects model (an alternative is to use the approach by Mundlak, 1978). This approach implies that we explicitly model the distribution of the individual's unobserved effects conditional on the pre-sample of the dependent variable. In practice, the approach implies that the pre-sample value of the dependent variable in 1860 is added as an additional covariate. Second, as a further robust test, we also estimate a random effects linear probability model (Model 6). Nevertheless, linear probability models have the disadvantage that the estimated probabilities are not restricted to the interval [0–1]. That said, the results between the different methodological approaches are qualitatively similar.

Table 4 delves further into the analysis showing the results when cooperatives are distinguished by type: agrarian and non-agrarian (referred here as urban).

TABLE 4

In general, our study confirms the importance of *local conditions* for the spread of cooperativism. Urban cooperatives were more likely to be formed in densely populated municipalities. This, however, is not the case for agrarian cooperatives, as we would expect. The result is robust across specifications. Similarly, coastal municipalities, captured with the average altitude, witnessed this process with greater intensity. In sum, cooperatives were mainly established in urban agglomerations or rural contexts near the coast. The latter were, on the whole, more accessible and had more fertile land (Frígola 1824; Dirección General de Agricultura, Industria y Comercio 1891). Better land and access to the main markets encouraged the development of a market-oriented agriculture where cooperatives became an alternative for many farmers.[15]

Still, the above discussion cannot alone explain why in some municipalities cooperatives were rapidly adopted. As previously discussed, illiteracy hinders the development not just of a

cooperative, but of a business enterprise. In line with the literature, our results show that illiteracy slowed down this advance (Henriksen 1999; Martínez-Soto et al. 2012; Garrido 2014). Literacy facilitated cooperation and, above all, permitted the management of the cooperative by its own members. Since they were responsible for the management and accounting, and critical decisions were usually discussed before approval or rejection, reading, writing and numerical skills were indispensable.[16]

Likewise, wealth per capita had a negative and statistically significant effect. As James Simpson (2000) pointed out, agricultural cooperatives were more widespread in areas where small and medium-sized holdings predominated, because they improved the bargaining position of farmers. In urban contexts, consumers' or producer cooperatives were often formed by industrial workers. In the city of Barcelona between 1900 and 1934, 70% of the members of the cooperative *Pau i Justícia*, one of the best-known consumers' cooperative, were industrial and construction workers, miners and small farmers.[17]

The novelty of cooperativism also deserves further discussion. Cooperatives emerged as an alternative or a *new way*. Then, the dissemination of knowledge played a fundamental role. Since this study goes from the early beginnings of the cooperative movement to the 1930s, we need to account for the spectacular advances in transport and communications. In particular, our results suggest that access to the railway network affected the diffusion process. Furthermore, proximity to the largest urban agglomeration, Barcelona, played a significant role, particularly for the spread of urban cooperatives. Interestingly, there appears to be a spatial-effect, or peer-effect, only for the diffusion of agrarian cooperatives. In other words, the likelihood that an agrarian cooperative is formed in a given municipality increases when cooperatives have already reached neighbouring municipalities, and more specifically, when these cooperatives are of the agrarian type.[18] It is worth noting, however, that non-agrarian cooperatives were largely concentrated in urban centres.

That said, this study also explores the relevance of social capital. Beltrán (2012) paved the way by emphasising the role played by the pre-existing stock of social capital, derived from the management of communal land or irrigation. In this approach, we attempt to identify this

effect with a set of variables. Notwithstanding the difficulties related to the measurement of social capital, we find that cooperatives were more likely to emerge in municipalities with previous presence of guilds and irrigation systems. Also, it seems that the number of civil cases (per 1,000 inhabitants) had a negative and statistically significant effect. Understandibly, civil cases were somewhat voluntary, that is to say, individuals decided whether or not to bring their case into court. Then, the existence of strong interpersonal relationships would allow for conflict resolution without the need to appeal for external arbitration. Criminal cases, on the other hand, would not permit that.[19]

In order to shed further light on the subject, we also include in the empirical analysis other controls such as the type of jurisdiction and the existence of communal property. In both cases, there is no statistically significant impact. In the literature, it has been argued that communal land in municipalities under secular or eclessiastical jurisdictions was more likely to be privatised. Yet, our study does not provide evidence in support of this. In this regard, it is worth stressing that communal land, after the disentailment processes of the 18th and 19th centuries, remained in small, mountainous, and isolated municipalities in the province of Lérida. More specifically, small communities of western Catalonia where, as map 3 illustrates, cooperativism did not spread. Moreover, emigration from the hinterland to the coast, especially to Barcelona and other industrial towns, raises a relevant issue (Silvestre 2005). If social capital was embedded in these migrants and many of them ended up as industrial or construction workers, then the pre-existing stock of social capital would have had a greater impact.[20]

TABLE 5

We test the consistency of our main results presented in table 3 and 4 by conducting two additional robustness checks. First, though we are confident that geographic distance is well fitted to capture the strength of the spatial interdependencies, in Table 5, we present the results of estimations based on three alternative definitions of the spatial weight matrix. First, we use a nearest neighbour structure to determine the spatial relationship between the municipalities. For

each municipality *i* the geographically 5 nearest municipalities are defined as neighbours with spatial influence. This weighting alternative gives close municipalities a strong weight, while ignoring the influence of more remote locations. Columns (1), (4) and (7) in Table 5 present the results using this spatial weight matrix. The major difference with respect to previous results is the fact that the peer-effect of urban cooperatives appears now positive and significant in explaining the diffusion process of urban cooperatives (column 7). Therefore, it seems that close neighbours exert a spatial effect in the diffusion process of urban cooperatives. Second, we construct a spatial weight matrix using the inverse distance between the pairs of locations that lie within a 20km and 60km distance band, respectively. As we increase the radius of influence, the urban peer-effect loses statistical significance in explaining the diffusion process of urban cooperatives (column 9). Therefore, it seems that only close neighbours (within a 20 km) exert a positive imitation effect in the diffusion of urban cooperatives. That it is not the case for agrarian cooperatives[21]. Having said that, the rest of variables of interest stay robust in size and significance.

Second, as a further robustness test, Table A2 in the appendix reports the results of a linear probability model with fixed effects and standard errors corrected for potential spatial autocorrelation in the spirit of Conley (1999) or Kelly (2019)[22]. Despite the advantage of being able to correct for time-invariant unobserved heterogeneity and potential spatial autocorrelation, this specification is not extent of disadvantages. The most relavant in our analysis, is that our proxies for pre-existing social capital, and the rest of time-invariant regressors, will be swept away by the within estimator. Furthermore, those variables with little within variation (for instance, illiteracy) will be imprecisely estimated. All in all, the results presented in Table A.1 support our results. Local conditions, in this case captured also by the municipality fixed effects, are important in the diffusion process of cooperatives. Particularly, densely populated areas were more prone to the rise of urban cooperativism. Moreover, the knowledge diffusion, thanks to the access to the railway and the spatial effects, played also an important role.

In sum, cooperatives spread within Catalonia following a clear pattern. Densely populated municipalities had the upper hand. Additionally, cooperativism moved from the coast to the

hinterland. Cooperatives were first formed in urban settings, around Barcelona and southern Gerona. Then, consumers' and production cooperatives spread to accessible municipalities where literacy rates were, on average, relatively high. Also, the existence of a pre-existing stock of social capital facilitated this process. Last but not least important, our findings also suggest that spatial or peer-effects should not be discarded.

6. Conclusions

Over the last years, there has been mounting interest in the role of cooperatives for social and economic development. Poverty, rising inequality and social polarisation have thrust cooperatives into the limelight. But, this is somehow a *déjà vu*. The Industrial Revolution brought about extraordinary socioeconomic change. During the 19th century, the so-called *social question* debate called into question the welfare implications of industrialisation and the market economy. In this context, cooperatives emerged, offering an alternative way to capitalism. Yet, cooperativism spread unevenly across and within countries.

In this study, we examine why cooperatives were rapidly adopted in some places but not in others. For this purpose, a novel database has been compiled with information on cooperatives founded in Catalonia between 1860 and 1939. Regardless of their nature, it appears that cooperatives first reached densely populated areas in eastern Catalonia, and then moved into the hinterland. In this process, social and human capital played a fundamental role. Municipalities with a pre-existing stock of social capital and relatively high literacy rates exhibited a greater tendency to form cooperatives. Interestingly, spatial or peer-effects were also relevant, thereby stressing the relevance of information flows.

The transmission of knowledge across space was crucial. Once cooperatives were founded, the notion or idea of cooperativism was born. Then, this novelty spilled out. But, it only reached areas where local conditions were conducive to its development. In sum, this study exemplifies the complexity of history. Although disentangling the effect of past events, or path

dependence, from contemporaneous factors is not trivial, further effort and thought should be made in order to better understand cooperation and collective action.

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Table 1. Statistical summary

	Total cooperatives		Agrarian cooperatives		Urban cooperatives*	
Period	Total	Sample	Total	Sample	Total	Sample
1860-1876	26	26	0	0	26	26
1877-1886	19	19	0	0	19	19
1887-1899	172	172	27	27	145	145
1900-1909	280	279	102	101	178	178
1910-1919	657	655	348	346	309	309
1920-1929	402	395	176	174	226	221
1930-1939	547	547	222	222	325	325
TOTAL	2,103	2,093	875	870	1,228	1,223

Source: Celada (1989).

Notes: *Urban cooperatives (consumers', producers', fishermen's, credit, housing, electrical supply and pharmaceutical)

Table 2. Descriptive statistics of explanatory variables

Variable	Mean	Std. Dev.	Min.	Max.
Local conditions				
Population density	0.408	0.873	0.009	15.222
Illiteracy	0.535	0.187	0.081	0.979
Altitude (logs)	5.526	1.245	1.099	7.339
Wealth (logs)	4.628	0.514	2.286	8.076
Diffusion				
Hours to Barcelona (logs)	3.056	0.675	0.262	5.501
Distance to railway (logs)	2.405	1.251	0	5.038
Peer effect (t-1)	0.121	0.157	0	0.857
Social capital				
Guilds [0,1]	0.071	0.257	0	1
Royal jurisdiction [0,1]	0.355	0.479	0	1
Irrigation system [0,1]	0.287	0.453	0	1
Commons [0,1]	0.186	0.389	0	1
Crc_1859	2.067	0.738	0.670	5.530
Cic_1862	10.278	7.540	0.690	58.820

Source: see text.

Table 3. Determinants of the creation of new cooperatives in Catalonia, 1860-1939

Estimation Method	RE Probit				Wooldridge (2005)	RE Linear Probability
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
				Local conditions		
Popden	0.022***	0.018***	0.022***	0.011**	0.010**	0.032***
	(0.006)	(0.005)	(0.006)	(0.005)	(0.004)	(0.008)
Illiteracy	-0.156***	-0.132***	-0.150***	-0.147***	-0.116***	-0.130***
	(0.036)	(0.036)	(0.040)	(0.040)	(0.038)	(0.036)
Altitude (log)	-0.035***	-0.023***	-0.025***	-0.025***	-0.023***	-0.029***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.006)
Wealth (log)	-0.084***	-0.088***	-0.096***	-0.089***	-0.068***	-0.081***
	(0.010)	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)
				Diffusion variables		
Hours_Bcn (log)		-0.032***	-0.026**	-0.034***	-0.027**	-0.029**
		(0.010)	(0.012)	(0.012)	(0.011)	(0.014)
Dist_rw (log)		-0.022***	-0.021***	-0.015***	-0.011**	-0.009
		(0.005)	(0.006)	(0.006)	(0.005)	(0.006)
Peer effect			0.356***	0.420***	0.435***	1.070***
			(0.129)	(0.130)	(0.128)	(0.165)
				Social capital		
Guilds [0,1]				0.122***	0.091***	0.169***
				(0.018)	(0.016)	(0.028)
Royal jurisd. [0,1]				0.001	0.005	0.006
				(0.010)	(0.010)	(0.011)
Irrig. system [0,1]				0.030**	0.023**	0.028**
				(0.012)	(0.011)	(0.012)
Commons [0,1]				-0.022	-0.025*	0.006
				(0.016)	(0.014)	(0.014)
Crc_1859				0.006	0.005	-0.004
				(0.008)	(0.008)	(0.009)
Cic_1862				-0.002***	-0.002**	-0.001*
				(0.001)	(0.001)	(0.000)

Province effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Time effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	7,365	7,365	6,314	6,314	6,314	6,314
Chi2	842.19	922.33	852.39	894.81	997.92	1260.20
Log likelihood	-2,254.12	-2,230.88	-2,176.84	-2,141.28	-2,071.72	

Note: All estimates include the corresponding period and provincial dummy variables. Model 5 includes also the pre-sample value of the dependent variable which is statistically significant. RE means firm-random effects. Average marginal effects and clustered standard errors are reported. Significance level: ***p<0.01, **p<0.05, *p<0.1.

Source: see text.

Table 4. Determinants of the creation of new agrarian and urban cooperatives in Catalonia, 1860-1939

Dep. Var.	*Y(Agrarian)*		*Y(Urban)*	
	Model 1 *dy/dx (s.e.)*	Model 2 *dy/dx (s.e.)*	Model 1 *dy/dx (s.e.)*	Model 2 *dy/dx (s.e.)*
		Local conditions		
Popden	0.001	0.001	0.010***	0.010***
	(0.005)	(0.005)	(0.003)	(0.003)
Illiteracy	-0.100**	-0.096**	-0.083***	-0.084***
	(0.040)	(0.040)	(0.031)	(0.031)
Altitude (log)	-0.023***	-0.023***	-0.010***	-0.010***
	(0.005)	(0.005)	(0.003)	(0.003)
Wealth (log)	-0.049***	-0.049***	-0.059***	-0.058***
	(0.011)	(0.011)	(0.008)	(0.008)
		Diffusion variables		
Hours_Bcn (log)	-0.015	-0.020*	-0.025***	-0.023***
	(0.011)	(0.012)	(0.009)	(0.009)
Dist_rw (log)	-0.014**	-0.013**	-0.008*	-0.008*
	(0.006)	(0.006)	(0.004)	(0.004)
Peer effect	0.511***		0.024	
	(0.142)		(0.088)	
Ag_Peer effect		0.659***		0.033
		(0.159)		(0.102)
Ur_Peer effect		0.008		0.107
		(0.204)		(0.127)
		Social capital		
Guilds [0,1]	0.068***	0.068***	0.074***	0.075***
	(0.019)	(0.019)	(0.011)	(0.011)
Royal jurisd. [0,1]	-0.003	-0.001	0.006	0.006
	(0.011)	(0.011)	(0.007)	(0.008)
Irrig. system [0,1]	0.024*	0.024*	0.019**	0.019**
	(0.013)	(0.012)	(0.009)	(0.009)
Commons [0,1]	-0.021	-0.018	-0.009	-0.010
	(0.017)	(0.017)	(0.013)	(0.013)
Crc_1859	0.012	0.012	-0.006	-0.006
	(0.008)	(0.008)	(0.007)	(0.007)
Cic_1862	-0.001*	-0.001*	-0.002*	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	5268	5268	6314	6314

Note: All estimates include the corresponding temporal and provincial dummy variables. Average marginal effects (*dy/dx*) and robust standard errors (*s.e.*) are reported. Significance level: ***p<0.01, **p<0.05, *p<0.1.

Source: see text.

Table 5. Alternative spatial weight matrices

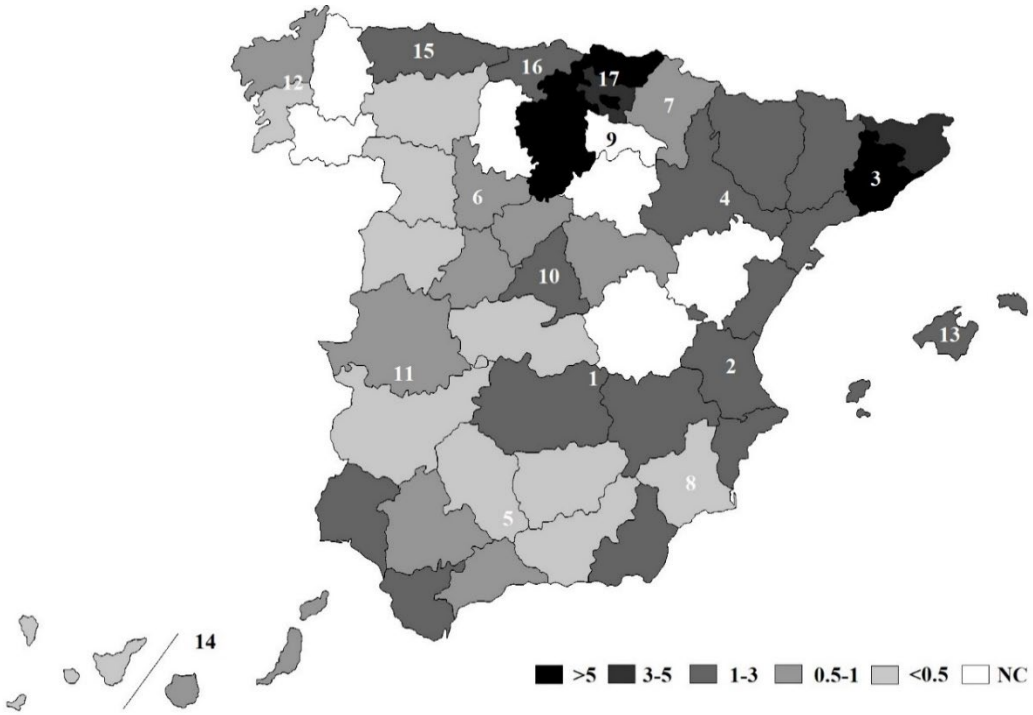
	Total			**Agrarian Cooperatives**			**Urban Cooperatives**		
	5-nearest neighbors	Within 20 km.	Within 60 km.	5-nearest neighbors	Within 20 km.	Within 60 km.	5-nearest neighbors	Within 20 km.	Within 60 km.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Popden	0.010*	0.011**	0.011**	0.001	0.001	0.001	0.009***	0.010***	0.010***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)
Illiteracy	-0.144***	-0.148***	-0.149***	-0.090**	-0.101**	-0.098**	-0.084***	-0.086***	-0.084***
	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.031)	(0.031)	(0.031)
Altitude	-0.025***	-0.024***	-0.025***	-0.024***	-0.022***	-0.022***	-0.009***	-0.009***	-0.009***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)
Wealth	-0.090***	-0.088***	-0.088***	-0.052***	-0.049***	-0.049***	-0.058***	-0.058***	-0.058***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.008)	(0.008)	(0.008)
Hours_Bcn	-0.042***	-0.037***	-0.034***	-0.029***	-0.020*	-0.020*	-0.023***	-0.022***	-0.024***
	(0.011)	(0.012)	(0.012)	(0.011)	(0.011)	(0.012)	(0.008)	(0.008)	(0.009)
Dist_rw	-0.016***	-0.015***	-0.015***	-0.015***	-0.014**	-0.013**	-0.009**	-0.009**	-0.008*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)
Peer effect	0.072***	0.139***	0.225***						
	(0.021)	(0.038)	(0.066)						
Ur_Peer effect				-0.023	0.055	0.028	0.054***	0.066*	0.031
				(0.030)	(0.058)	(0.107)	(0.019)	(0.037)	(0.071)
Ag_Peer effect				0.090***	0.194***	0.339***	0.000	0.011	0.029
				(0.026)	(0.048)	(0.081)	(0.018)	(0.032)	(0.055)
Guilds	0.122***	0.122***	0.122***	0.066***	0.068***	0.069***	0.075***	0.075***	0.075***
	(0.018)	(0.018)	(0.018)	(0.019)	(0.019)	(0.019)	(0.011)	(0.011)	(0.011)
Royal jurisd.	-0.000	0.001	0.001	-0.005	-0.003	-0.002	0.007	0.006	0.006
	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)	(0.007)	(0.007)	(0.008)
Irrig. system	0.028**	0.029**	0.031**	0.023*	0.024*	0.024*	0.018**	0.019**	0.019**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.009)	(0.009)	(0.009)
Commons	-0.023	-0.023	-0.021	-0.023	-0.020	-0.017	-0.009	-0.010	-0.009
	(0.016)	(0.016)	(0.016)	(0.017)	(0.017)	(0.017)	(0.013)	(0.013)	(0.013)
Crc_1859	0.006	0.006	0.005	0.011	0.012	0.010	-0.005	-0.005	-0.006

	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
Cic_1862	-0.002***	-0.002***	-0.002**	-0.001*	-0.001*	-0.001*	-0.002*	-0.002*	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	6314	6314	6314	5268	5268	5268	6314	6314	6314

Note: All estimates include the corresponding temporal and provincial dummy variables. Average marginal effects (*dy/dx*) and robust standard errors (*s.e.*) are reported. Alternative spatial weight matrices; all row-normalized. Significance level: ***p<0.01, **p<0.05, *p<0.1.

Source: see text.

Map 1. Number of urban cooperatives* per 100,000 inhabitants in Spain, by provinces, 1933.



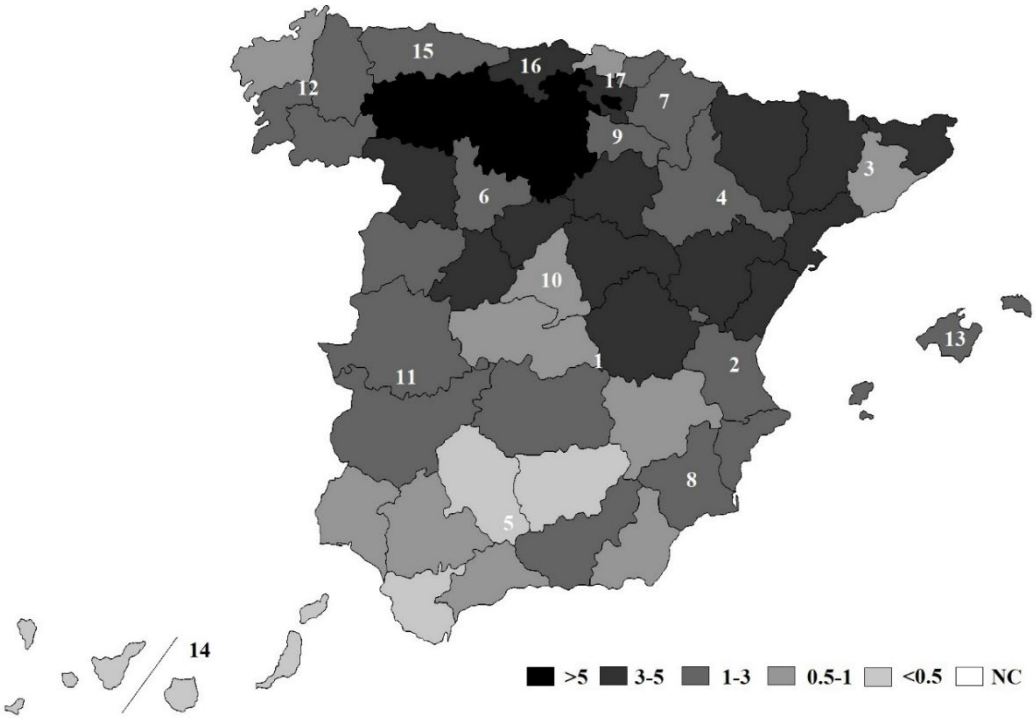
*Urban cooperatives (consumers', producers', fishermen's, credit, housing, electrical supply and pharmaceutical)

NC: No cooperatives

Spanish regions: 1 (Castile-La Mancha); 2 (Valencia); 3 (Catalonia); 4 (Aragon); 5 (Andalusia); 6 (Castile and León); 7 (Navarre); 8 (Murcia); 9 (Rioja); 10 (Madrid); 11 (Extremadura); 12 (Galicia); 13 (Balearic Islands); 14 (Canary Islands); 15 (Asturias); 16 (Cantabria); 17 (Basque Country).

Source: Instituto Nacional de Estadística (1934); Dirección General de Instituto Geográfico y Estadístico (1932).

Map 2. Number of agrarian cooperatives per 10,000 inhabitants* in Spain, by provinces, 1933.



* In this map the number of agrarian entities per 10,000 inhabitants has been calculated, and not for every 100,000 inhabitants as in the Map 1. The purpose of this change is that in both maps the same rank can be used to classify the provinces according to their cooperative intensity, because the number of urban entities in the total of Spain was much lower than that of agrarian in those years.

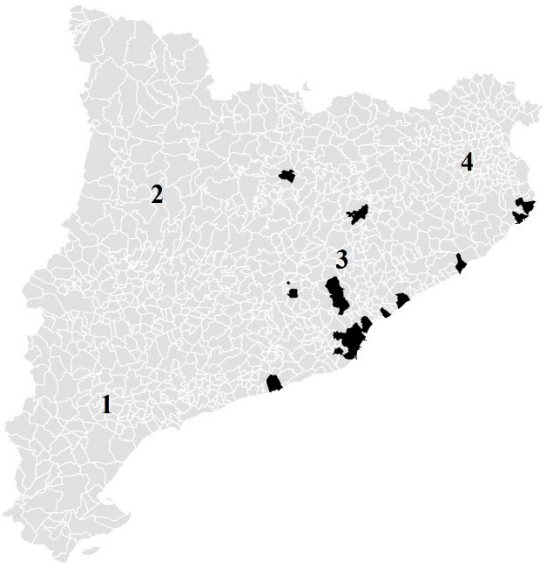
NC: No cooperatives

Spanish regions: 1 (Castile-La Mancha); 2 (Valencia); 3 (Catalonia); 4 (Aragon); 5 (Andalusia); 6 (Castile and León); 7 (Navarre); 8 (Murcia); 9 (Rioja); 10 (Madrid); 11 (Extremadura); 12 (Galicia); 13 (Balearic Islands); 14 (Canary Islands); 15 (Asturias); 16 (Cantabria); 17 (Basque Country).

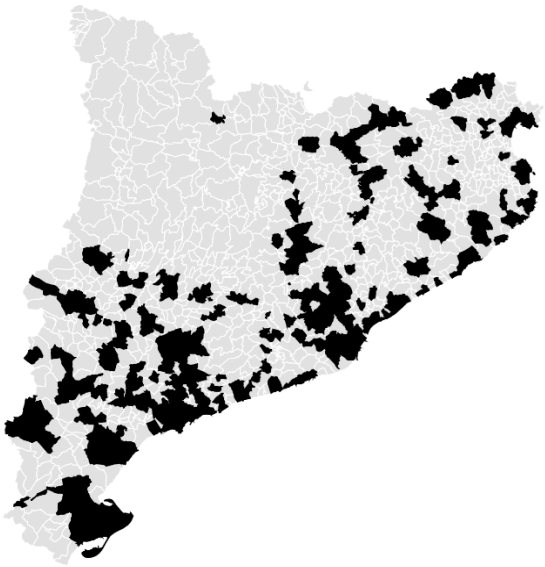
Source: Ministerio de Agricultura (1934); Dirección General de Instituto Geográfico y Estadístico (1932).

Map 3. Presence of cooperatives in Catalonia, 1860-1939, by municipalities.

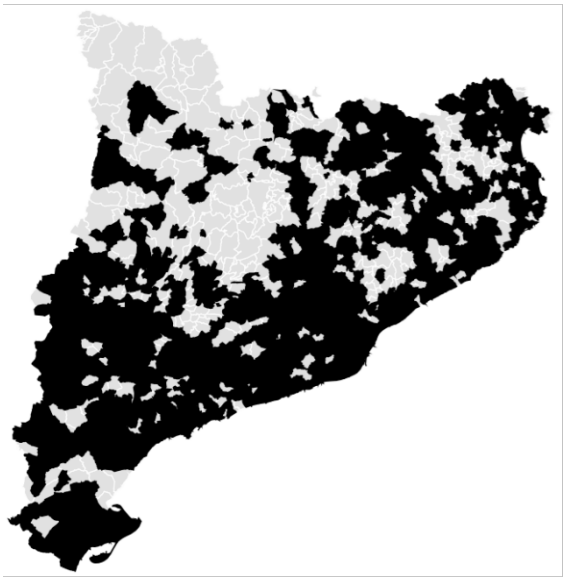
3a 1860-1877



3b 1860-1910



3c 1860-1939



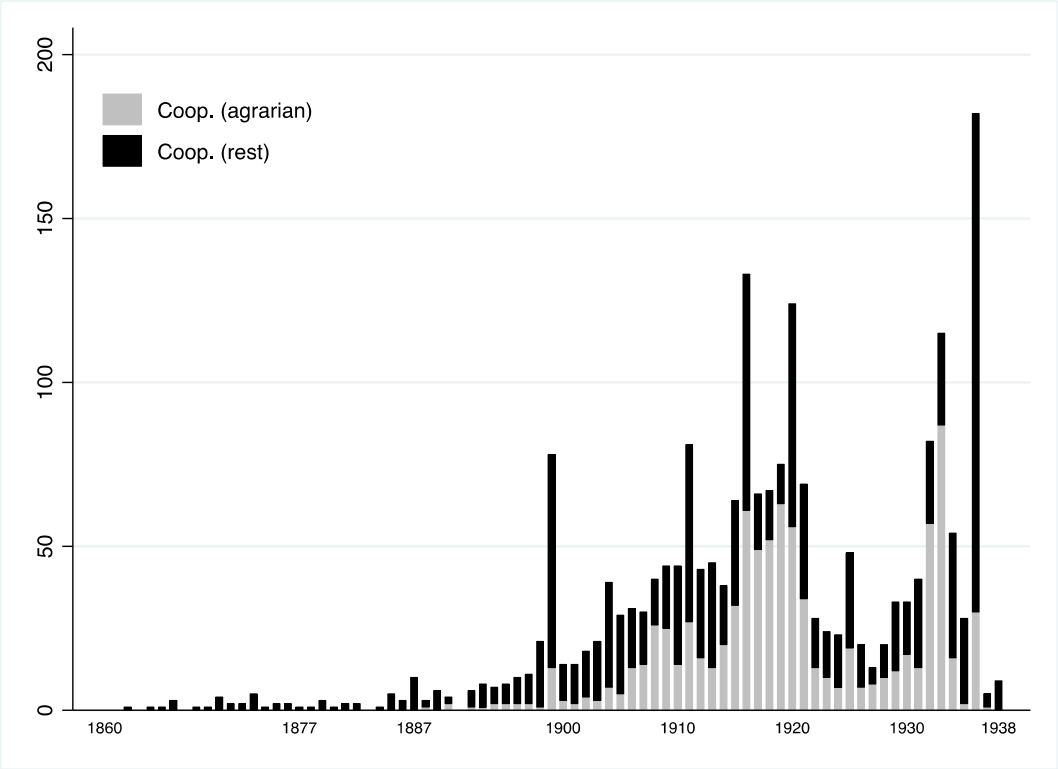
Note: The maps show the current municipalities, while the data has been worked following the municipal structure of the Spanish Second Republic (1931-1936). So they have been adjusted to the different municipal changes produced since the 1930s until today, especially in the Pyrenean counties of the provinces of Lérida and Gerona.

Catalonian provinces: 1 (Tarragona); 2 (Lérida); 3 (Barcelona); 4 (Gerona).

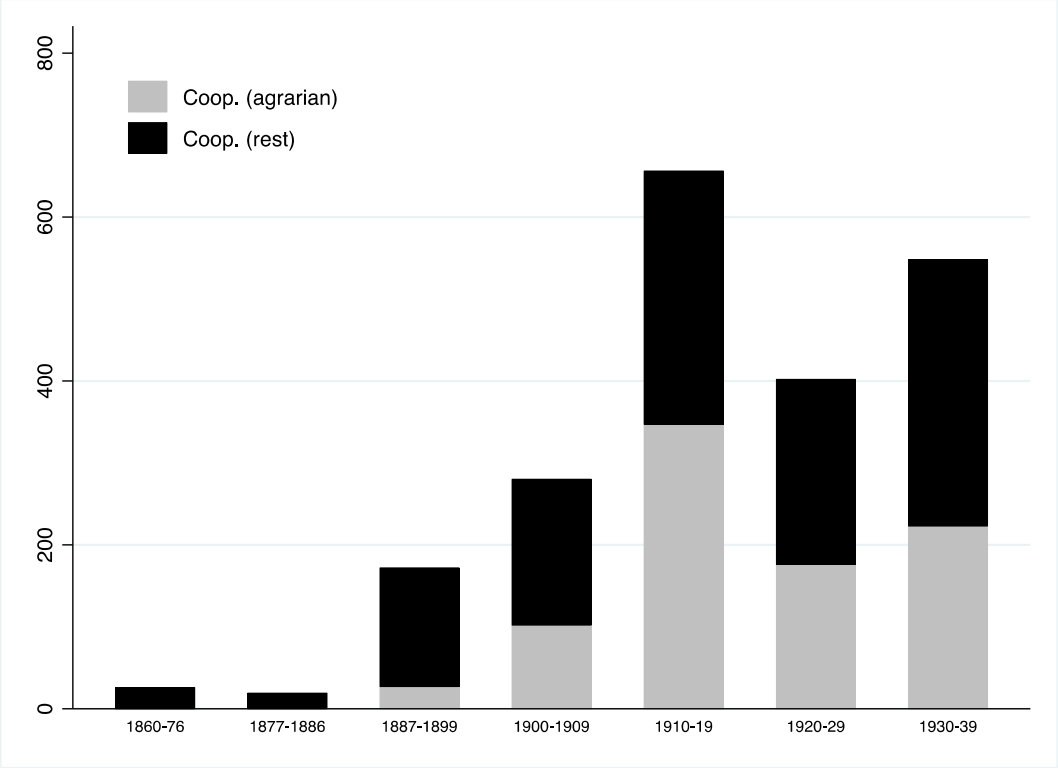
Source: Celada (1989).

Figure 1. New cooperatives created in Catalonia, 1860-1939, by years and census periods.

1a Years



1b Census periods



Source: Celada (1989).

[1] For more information, see http://www.un.org/en/events/coopsyear/

[2] Initially, labour organisations had rejected the cooperative model because it reinforced the exploitation mechanisms of social elites (Brazda and Schediwy 1989, pp. 14-16).

[3] In this study, urban cooperatives include consumers, producers, fishermen, credit, housing, electrical supply and pharmaceutical.

[4] Measured by the percentage that the members of the cooperatives and their families supposed about the total population, assuming families of four members and that only one was a member.

[5] The periods are based on the year of publication of the national censuses (Junta General de Estadística 1863; Dirección General de Instituto Geográfico y Estadístico 1883, 1891, 1902, 1913, 1922, 1932).

[6] As Celada (1989) describes, the information was extracted from numerous primary sources consulted in public and private archives. This initiative, sponsored by the *Confederació de Cooperatives Catalana*, aimed to carry out a census of cooperatives in Catalonia between 1860 and 1938. This census was prepared from a deep investigation of primary sources in multiple archives, avoiding the problems mentioned by Guinnane and Martínez-Rodríguez (2011, pp. 84-89) regarding the quantification of cooperatives with the Spanish official statistics due to the lack of definition of these societies in the legislation.

[7] It is worth remembering that agrarian cooperatives are rather heterogeneous regarding its main economic activity, and that some specific sectors (wine, milk) appear to have been more successful which, in turn, might affect the decision to establish a cooperative ex-post (Henriksen, 1999; Simpson, 2000). Sadly, our dataset does not permit the identification of the specific activity or activities that each agrarian cooperative did. Anyhow, in the centre and northern parts of the province of Lérida, agricultural cooperatives barely developed despite being one of the main milk producing areas in Catalonia (Hernández-Adell, 2012), while in other parts several distinct agrarian cooperatives (cereal, olive oil or fruit, vegetable products) were formed. Then, although some sectors might be more prone than others to cooperativism, there seems to be substantial heterogeneity across space. Even more, it cannot be discarded that these cooperatives dedicated to various agricultural subsectors.

[8] Although most of the cooperatives are either consumer's, production or agrarian, the dataset also includes associations created for housing (2.2% of the total), credit (0.6%) and health (0.6%) purposes, among others.

[9] Regarding non-agrarian cooperatives, 54.7% were established in municipalities with more than 10,000 inhabitants in 1900. This figure increases to 59.8% and 71.8% for municipalities with more than 5,000 and 3,000 inhabitants respectively.

[10] On 4 july 1931, during the Second Republic (1931-1939), the first national law ("*Ley de Cooperativas*") of cooperatives was passed.

[11] There are two main reasons why we have adopted a random effects specification. First, to our knowledge, panel data probit estimations are only available with random effects (we use the command *xtprobit* in stata). Second, the preference for random effects is also due to the fact that, as stated by Wooldridge (2010, 286), "*In cases where the key variables in* x_t *do not vary much over time, fixed effects and first-differencing methods can lead to imprecise estimates. We may be forced to use random effects estimation*."

[12] In our period of study, women-members were generally either widows or daughters of deceased members.

[13] We acknowledge though that the effect from the spatial lag may be slightly upward biased.

[14] This register lists several rural areas owned by the state in Lérida (nº 4, 14, 16 and 17) in the municipalities of Ars, Pallerols and Tardente, which could be used by the residents for grazing, firewood and timber. In the municipality of Claverol, Mount Bayarrí (nº 221) was listed as belonging to the town of Sosis, but the right-of-use was owned by the Dukes of Medinaceli, who received an annual fee paid by the residents. The register also records that the towns of Peramea and Pujal held rights over firewood and grazing, but the livestock were not allowed to stay overnight on the land (Instituto Nacional para la Conservación de la Naturaleza 1993, p. 431). In the municipalities of Vilech and Estaná, Mount Llobateras (nº 313) was listed as belonging to Obra Pía de la Seo de Urgell, but the residents of the two towns could walk and graze their animals there, as well as collecting firewood and timber (Instituto Nacional para la Conservación de la Naturaleza 1993, p. 443).

[15] This would partly explain the smaller impact of cooperativism in the province of Lérida (see Map 3), especially in the higher areas of the Pyrenees, where agricultural yields were lower than in the coastal areas during the 19th century (Dirección General de Agricultura, Industria y Comercio 1891).

[16] Nearly all (94%) new members of the consumers' cooperative *Pau i Justícia* (Barcelona) in the period 1900-1934 could read and write. The figures for *La Vanguardia Obrera* (Barcelona) are very similar. Archivo Municipal de Barcelona [hereafter AMB], Cooperativa Pau i Justícia, *Registro de socios*; Archivo de la Fundació Roca i Galés [hereafter AFRG], Cooperativa la Vanguardia Obrera, *Registro de socios*.

[17] In *La Vanguardia Obrera* (Barcelona), between 1894 and 1930, 57% of members belonged to these categories, compared to 75% in *Cooperativa de Súria* (Barcelona, 1916-1938) and 93% in *El Respeto Mutuo* (Hospitalet de Llobregat, Barcelona, 1910-1937). AMB, Cooperativa Pau i Justícia, *Registro de socios*; AFRG, Cooperativa la Vanguardia Obrera, *Registro de socios*; Archivo Municipal de Súria [hereafter AMS], Unió de Cooperadors de Súria, *Registro de Socios*; Archivo Municial de L'Hospitalet de Llobregat [hereafter AMHLL], Cooperativa El Respeto Mutuo, *Registro de socios*.

[18] Several studies in other disciplines also stress the relevance of the spatial-effect. For example, Brinks and Coppedge (2006) found that contiguity played a significant role in the spread of democracy.

[19] The human capital variable can also be used to indirectly measure social capital, as literacy rates can be directly related to the availability of communal goods and services. Until the 1900s, education expenditure in Spain depended on local authorities (teachers' salaries, school buildings, school equipment), and often these expenses were met with the revenues generated by communal property (Iriarte 2001; Beltrán 2013).

[20] In the period 1900-1934, 55% of the members of the cooperative *Pau i Justícia* (Barcelona) were from other regions of Catalonia and Spain, especially Aragon and Valencia. In a cooperative created in Súria (Barcelona), a small mining town, the proportion of non-local members was of 75%. AMB, Cooperativa Pau i Justícia, *Registro de socios*; AMS, Unió de Cooperadors de Súria, *Registro de Socios.*

[21] In this case, we observe a small increase in the size of the spatial lag (moving from column 4 to 6 in Table 5), which suggests that it is not pure geographic proximity, which influences the degree of spatial interdependencies in the diffusion of agrarian cooperatives.

[22] More specifically, spatial standard errors are based on the method proposed in Colella et al. (2019), implemented in Stata as "acreg", using a Bartlett kernel decay across observations. The FE-LPM remain strong and significant when we introduce standard errors corrected for spatial autocorrelation. All in all, this suggests that spatial autocorrelation is not responsible for the significance of our findings.

Supplementary Material to

Old wine in new wineskins? Understanding the cooperative movement: Catalonia, 1860-1939

Table A1. Description of variables

Variable	Description	Source
Dependent variable	Binary variable that takes the value of 1 if at least a new (agrarian or urban) cooperative is established in a given municipality and period; and 0 otherwise.	Celada (1989).
	Local conditions	
Population density	Number of male inhabitants per km^2, by municipalities and time periods.	Spanish population censuses.[1] Catalonia's statistical office (Idescat).[2]
Illiteracy	Percentage of illiterate male inhabitants, by municipalities and time periods.	Spanish population censuses.
Altitude	Altitude in meters, by municipalities.	Catalonia's statistical office (Idescat).
Wealth	Wealth per capita (male population only), by municipalities and time periods. It has been calculated based on the tax base established for the municipalities with the purpose of the tax collection (*Contribución Territorial Rústica, Pecuaria y Urbana*).	Gazettes of the provinces of Barcelona, Gerona, Lérida and Tarragona. Spanish population censuses
	Diffusion	

[1] Dirección General del Instituto Geográfico y Estadístico (1883, 1891, 1902, 1913, 1922, 1932); Junta General de Estadística (1863).

[2] The surface area of each municipality come from this institution. https://www.idescat.cat/emex/?lang=es

Hours to Barcelona	Distance from a municipality to the capital of Barcelona, measured in the hours walking that the route entailed for a person in 1824.	Frígola (1824). Google Maps.[3]
Distance to railway	Distance (in kilometres) from each municipality to the railway network, by time periods.	Franch-Auladell et al. (2013, 2014).
Peer effect	Distance weighted sum of the value of the dependent variable observed at neighbouring municipalities in each period.	See main text for further explanation.
	Social capital	
Guilds	Binary variable that takes the value of 1 if there was at least one guild in a municipality and 0, otherwise, in 1770-71.	*Expediente general sobre el arreglo de Cofradías, Gremios y Hermandades.*[4]
Royal jurisdiction	Binary variable that identifies whether a municipality was under royal jurisdiction in the *Ancién Régime* (1) or not (2) in 1824.	Frígola (1824).
Irrigation system	Binary variable of those municipalities that had an irrigation systems managed by collective institutions (1), and those that did not (2).	Junta Consultiva Agronómica (1918).
Commons	Binary variable of those municipalities that had common-pool resources (1), and those that did not (2).	Instituto Nacional para la Conservación de la Naturaleza (1993). La Gaceta de Madrid (1897).
Crc_1859	Number of criminal cases per 1,000 male inhabitants in 1859.	Ministerio de Gracia y Justicia (1860).
Cic_1862	Number of civil cases per 1,000 male inhabitants in 1862.	Ministerio de Gracia y Justicia (1866).

[3] Data come mainly from Frígola (1824), and have been complemented with information extracted from Google Maps (https://www.google.es/maps/).

[4] This source is essentially a census of guilds for the late 18th century. The report, elaborated by the Council of Castile, reported the information sent by the local authorities between 1768 and 1803 with the aim of finding out the number and characteristics of these associations. In our case, we have consulted the *Estado General de las cofradías, hermandades y congregaciones correspondientes al Principado de Cataluña*, elaborated between 1770 and 1771, and other historical sources. Archivo Histórico Nacional, *Estado General de las cofradías, hermandades y congregaciones correspondientes al Principado de Cataluña*, Consejos, 7106, Exp. 65; Cadiñanos (2017); Pendás García (1994); Magriná (1998); Fabra i Salvat (2000); Güell Junkert (2000); Torra i Elías (2001).

Table A2: Linear Probability Model with FE (FE-LPM) and FE with Conley corrected standard errors

	Y(Total)	*Y(Agrarian)*	*Y(Urban)*
	(1)	(2)	(3)
Popden	0.019	0.024	0.040**
	(0.015)	(0.017)	(0.018)
	[0.017]	[0.017]	[0.018]
Illiteracy	0.011	0.038	0.022
	(0.066)	(0.057)	(0.044)
	[0.054]	[0.053]	[0.040]
Wealth (log)	-0.051**	-0.026	-0.017
	(0.022)	(0.025)	(0.019)
	[0.021]	[0.022]	[0.016]
Dist_rw	-0.042***	-0.035**	-0.034***
	(0.016)	(0.019)	(0.011)
	[0.014]	[0.017]	[0.011]
Peer effect	0.891***		
	(0.149)		
	[0.146]		
Ag_Peer effect		0.363*	0.217*
		(0.200)	(0.122)
		[0.182]	[0.115]
Ur_Peer effect		0.605**	0.555**
		(0.296)	(0.247)
		[0.229]	[0.192]
Observations	6314	5268	6314
Municipality FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Log likelihood	-1307.486	-807.607	802.170

Note: Cluster robust standard errors are in parenthesis, while spatially corrected standard errors are in brackets. Significance level: ***p<0.01, **p<0.05, *p<0.1.

Source: see text.

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