

Commons, social capital, and the emergence of agricultural cooperatives in early twentieth century Spain

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The emergence of Spanish agricultural cooperatives from the end of the nineteenth century was a narrative of uneven regional development. It has been argued that the cooperative movement developed in areas where small and middle-sized farms were relatively important. This paper seeks to complement this explanation by analysing the role played by the pre-existing stock of social capital. The prior importance of institutions built around the use and management of collective resources is explored as an alternative proxy for social capital in pre-industrial economies. The results show that the social networks built around common lands and irrigation communities were a key element, together with relatively high levels of human capital and the existence of a wide layer of middle size farms, in facilitating the emergence of the cooperative movement in rural areas.

1. Introduction

The agricultural cooperative movement emerged and spread throughout Europe in response to the increasingly competitive global environment that followed the agricultural crisis of the late nineteenth century (Federico 2005). More integrated markets resulting from the combined effect of new technologies and expanding markets, led farmers to adapt to the new prevailing economic conditions. The advantages of cooperation for small farmers are varied but basically consist on the combination of the benefits of family farming with the economies of scale of acting together (133). Cooperatives facilitated mutual assistance, the acquisition of cheaper inputs, machinery and credit, the diffusion of information about new technology and methods, the building of processing facilities, and the increase of farmers' marketing power. Cooperation also helped farmers to overcome the problems of asymmetric information and locked-in between agricultural processors and their suppliers (Henriksen 1999). However, despite these advantages, the diffusion of cooperatives was unequal both between countries and within them (Federico 2005, pp. 168–172).¹

The Spanish experience fits particularly well into the international pattern since the emergence of the agricultural associations from the end of the nineteenth century was a narrative of uneven regional development, where the general failure was punctuated by the successful story of some regions (Garrido 2007).² Although the first cooperatives were established in the

¹ See also O'Grada (1977), Van Zanden (1991, pp. 22–23), Guinnane (1994), Galassi (1998), Baker (1999), Henriksen (1999), Simpson (2000), O'Rourke (2007), and Van der Hallen (2009).

² The main activities of the Spanish cooperatives were the purchase of agricultural inputs (mainly chemical fertilizers and machinery) and consumer products and the diffusion of information about technologies and methods

late nineteenth century, the Spanish cooperative movement did not take off until the beginning of the twentieth century when the Agrarian Syndicate Law of 1906 triggered the formation of new cooperatives by providing tax exemptions. The cooperative movement also received the support of other external agents, especially from the Catholic Church (Carasa Soto 1991; Majuelo and Pascual 1991). However, without a more dynamic role of the state, the farmers' lack of capital, the difficulties of obtaining long-term credit, and the weak support from wealthy landowners prevented a stronger cooperative movement (Simpson 2000; Carmona and Simpson 2003; Martínez Soto 2003; Garrido 2007). The percentage of members belonging to agricultural associations, around 12 percent of the total agrarian population by 1924, was indeed low by international standards. However, a closer examination reveals a more complex picture since some areas, especially in northern and eastern Spain, definitely stand out in terms of members enrolled (figure 1).

The propensity to cooperate has been related to the prevalence of small and medium-size farms, high levels of human capital, relatively low distances to markets and the specialization in products that could be commercialized in national or international markets (Henriksen 1999; Henriksen and O'Rourke 2005; O'Rourke 2007).³ In the Spanish case, it has been argued that, despite the failure of the central government to actively promote this kind of agrarian organization, the cooperative movement developed in those areas where a relatively significant group of small- and middle-sized farms was present, providing the size of their plots was large enough to secure their financial operations (Garrido 2007). Some authors have also emphasized the importance of trust to promote participation among peasants. The successful Danish example was based on high levels of social cohesion arising from a homogeneous population and an existing peasant value system that encouraged self-reliance and self-help within the group (Henriksen 1999, p. 60; Svendsen and Svendsen 2004, p. 176). In Ireland, on the contrary, the influence of social and political conflict encouraged distrust and impeded the diffusion of cooperatives (O'Rourke 2007). Similarly, agrarian associations in France were built on a "spirit of association", while the lack of mutual trust has been pointed as a potential cause behind the failure of credit cooperatives in Southern Italy and dairy cooperatives in Belgium (Galassi 1998; Baker 1999; Van der Hallen 2009). According to O'Rourke (2007, p. 1360), "there are qualitative grounds to believe that trust was indeed a factor involved in the decision to set up a cooperative... since, after all, it implied that one farmer's income depended on how well and honestly his neighbours did their work".

Following this approach, this paper seeks to complement traditional explanations by including the pre-existing stock of social capital as a crucial variable to understand why some areas were able to generate a more vibrant cooperative movement than others. The main hypothesis here is that the social networks and the personal links built around the use and management of collective resources, such as common lands and irrigation communities, were crucial elements in facilitating the emergence of the cooperative movement in rural areas. Through a comparative study of the historical data at the provincial level, this

(Garrido 1995, 2007). Processing, commercial, and credit activities remained relatively rare, although their importance grew over time, especially after World War I. Agricultural associations also facilitated the articulation of farmers' interests and acted as pressure groups to obtain advantages from the state (Planas 2003).

³ The support of the state, by allowing freedom of association and facilitating subsidies, has also been considered an important but not sufficient condition for the emergence of cooperatives (Henriksen 1999). The existence of booming markets is not enough either, as the English dairy industry illustrates (Taylor 1976).

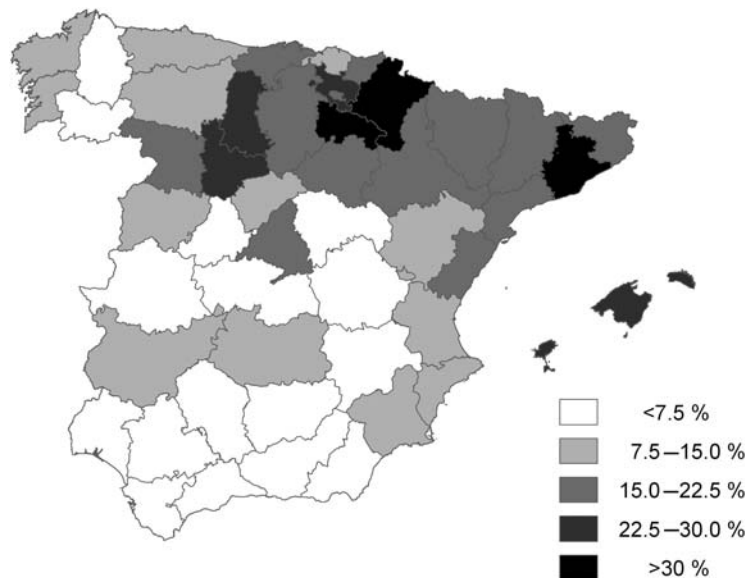


Figure 1. *Agrarian Cooperatives, 1923 (members over agrarian population).*
 Sources: *Jefatura Superior de Estadística (1926)* and *Dirección General del Instituto Geográfico y Estadístico (1922).*

analysis intends to unveil whether, and under which conditions, the social networks formed around the use and management of common resources might have promoted the constitution of agricultural associations in early twentieth century Spain.

2. Commons and social capital

Building on the seminal works by Putnam et al. (1993) and Coleman (1990), a growing literature has employed the concept of social capital to account for successful collective action and diverse economic and political performance.⁴ Social networks, values, and norms facilitate mutual cooperation by fostering predictable behaviour, mutual obligation, and trust among individuals and groups (Wolcock 1998; Ostrom and Ahn 2003). In other words, social capital reduces the transaction costs of collective action and limits free-riding by facilitating decision-making, mobilization and management of resources, communication and coordination, monitoring, and enforcement and conflict resolutions. The concept of social capital has nonetheless been open to criticism for its ambiguity, for the unclear direction of causation and for the difficulties in measuring it (Sobel 2002). Different proxies, such as voluntary associations, voter turnout and surveys' responses, among others, have been used with uneven fortune to assess the level of "civiness" within particular societies. These problems are especially acute when analysing historical social capital.

This paper explores an alternative proxy for social capital in pre-industrial economies by focusing on the prior importance of institutions built around the use and management of collective resources. The selection of the proxy variable is inspired by the specific vehicle

⁴ See La Porta et al. (1997) and Knack (2002), among others.

through which social capital is acquired, namely the existence of networks that allow for social interaction (Grootaert and Bastelaer 2002, p. 5). Putnam et al. (1993) regards craft guilds as incubators of social capital since they promoted horizontal reciprocal trust. Similarly, formal institutions, regardless of whether participation in them was voluntary or obligatory, formed the basis of rural social capital in later medieval and early modern English villages (McIntosh 2001). These institutions allowed “the creation of personal networks based upon respect, trust and shared experience that comprised people beyond their own families, immediate neighbours, and personal friends” (p. 128). Likewise, Svendsen and Svendsen (2004) trace back the stock of social capital using agricultural cooperatives from the mid-nineteenth century in Denmark and Poland, while stressing the role of the commons as alternative potential indicators of the presence of social capital.

The existing common lands and irrigation communities at the beginning of the twentieth century in Spain provided dense networks of continuous social interactions and fertile soil for the development of values and social norms. The structured social interaction formed around the use and management of these collective resources was the outcome of a centuries-long development, resulting in longstanding traditions of local cooperation. Irrigation communities, predominantly located on the Mediterranean coast and in some interior provinces, went at least back to medieval ages and the same holds true for the remaining common lands in most of the country although their origins remain unclear (Pérez Picazo and Lemeunier 1990; GEHR⁵ 1994). The social interactions built around these institutions induced mutual awareness and control, favouring cooperative behaviour by facilitating compliance and, in the long run, impregnating social values and norms of behaviour that were transmitted across generations (Gallego 2007, pp. 54–63). The use and management of these resources implied consensus, together with monitoring and enforcement mechanisms that facilitated carrying out what had been agreed. Information flowed easily through the channels provided by these institutions and formal and reputation mechanisms encouraged honest behaviour.

Water, on the one hand, has always been a crucial production factor in agrarian societies since its availability not only increases agricultural productivity, but also the security of crops. Irrigation communities managed water resources by constructing, maintaining and expanding the physical system, allocating water to the users and resolving potential conflicts (Ostrom 1990, pp. 69–81; Garrido 2011). These functions were achieved through regular meetings and a body of formal and informal norms and rules that regulated individual behaviour. A system of fines, together with a body of official guards and mutual informal self-monitoring, ensured compliance and prevented dishonest behaviour by individual users (wasting water, irrigating out of turn, failing to clean the secondary canals or flooding neighbours’ fields, among others). Irrigation communities faced the disequilibrium between increasing water demand and the limited water availability by expanding and improving the physical system and the efficiency of the distribution and allocation mechanisms. Furthermore, these institutions provided distributing methods to face water scarcity in times of drought or organize collective work to clean the main canals.

Common lands, on the other hand, also played a crucial role in the organization of production in organic economies since they were a source of pastures, fuel, and wood, together with temporary arable land, to members of the community (Iriarte 2002). The communal regime in Spain implied two main types of access to the land: a direct but regulated access

⁵ Grupo de Estudios de Historia Rural.

for all the members of the community or a temporary cession of use rights to particular individuals in exchange for a monetary income. The regulation underwent by the local communities, represented by local councils or municipalities, constituted the central element on the use of the commons by regulating the access to these resources, the enforcement of rules and the resolution of any conflict that might arise. Informal norms, reputation mechanisms, and peer-monitoring were also widespread (Moreno 1998). Their social functionality, which allowed for the capital accumulation of the elites while securing the reproduction of the less-favoured groups, legitimated the system (Iriarte 2002, p. 20). In this sense, common lands contributed to prevent increasing differentiation and potential social disintegration, which favoured social cohesion. Significantly, the existence of the commons also facilitated the development of reciprocity or mutual aid mechanisms, based on the expectations about future interactions that their collective use implied (Iriarte 1998, p. 125).

The extraordinary resilience of communal practices in Spain suggests that cooperative behaviour was strong within those communities (Ostrom 1990). Their long-lasting success rested on their ability to solve the free-rider problem through a set of formal and informal rules operated at the local level and congruent with the social and environmental context in which they operated. This is not to suggest that these communities were free from conflict but instead that they developed internal mechanisms to manage it.⁶ The degree of autonomy, internal democracy, and equity enjoyed by the users should not be exaggerated either. Both systems, common lands and irrigation communities, reproduced the existing economic and social inequality that characterized the society in which they were immersed, but nonetheless, these systems allowed for the reproduction of the less-favoured groups and were flexible enough to adapt to changing circumstances (Herin 1990; Iriarte 2002; Calatayud 2008; Lana 2008). It has indeed been argued that these institutions were part of a wider “moral economy” where, despite the dominance of the elite, the interests of the less-favoured groups were preserved (Ferri 1997; Moreno 1998; Serrano 2005; Calatayud 2008). Potential conflicts were kept within certain limits because these systems would have been doomed to fail without the consensus and cooperation of the peasants (Moreno 1998; Garrido 2011). A culture of compliance to the norms emerged based on formal and informal rules, peer-monitoring, reputation mechanisms, and successful cooperation.⁷ Therefore, this kind of self-governing institutions tended to be efficient and sustainable “because of the social capital in the form of effective working rules those systems are more likely to develop and preserve, the networks that the participants have created, and the norms they have adopted” (Ostrom and Ahn 2003, p. xxiii).

However, the transition to capitalism and the establishment of the liberal state brought about changes in the way these resources were used and managed. In this sense, either their privatization or their appropriation and regulation by central authorities tends to eliminate the social networks, values, and norms built around communal property arrangements (Baland and Platteau 1996). Irrigation communities, on the one hand, underwent a formal reorganization which favoured users’ associations against other kind of institutions such as municipal councils and *Heredamientos* (Ferri 1997). The regulations included in the bylaws

⁶ See Garrido (2011) for internal differentiation and conflicts around water and Balboa (1999) and Jiménez Blanco (2002) for the case of common lands. Conflict around the commons became especially high when they were subject to privatization attempts. The level of conflict and social cohesion was of course influenced by the existing inequality within the local community itself (Gallego 2007).

⁷ The activities of these institutions trespassed their own boundaries and were enmeshed in the culture of the local communities, in the form of everyday practices or popular traditions and festivities (Serrano 2005, pp. 437–438).

were nonetheless preserved and adapted to meet new constraints. It has been argued that these changes reinforced the position of the large landowners within these organizations, but an unequal structure was already present in the traditional regime and the liberal state only confirmed those trends (Pérez Picazo and Lemeunier 1990). Furthermore, the number of users and the land irrigated by canals and *acequias* (secondary canals) expanded during the nineteenth century and early twentieth century in some areas, which strengthened the importance that these institutions had for local communities and agricultural development (Calatayud 1993).

Common lands, on the other hand, suffered an intense attack from the end of the eighteenth century onwards that led to a massive privatization, either of their property rights or the way in which these resources had been traditionally used (Balboa 1999; Iriarte 2002; Jiménez Blanco 2002). The outcome of this process, however, widely varied by region (GEHR 1994). The diverse persistence of common lands not only reflects the different stock of structural social capital, but also serves to highlight the social consensus that these spaces generated, particularly in those areas that better resisted the privatization pressures. The concept of social cohesion has indeed been used to explain why common lands survived in some areas (Iriarte 1998; Balboa 1999; Serrano 2005).⁸ According to Lana (2008, p. 170), despite the great changes caused by the emergence of capitalism and liberalism, the notion of “community”, understood as a social network built around formal and informal norms, survived where common property and collective practices did not disappear. Likewise, the protest movements sparked by the disappearance of common lands during the second half of the nineteenth century and early twentieth century can be seen as a collective learning process that also contributed to the emergence of agricultural associations, especially in those areas where opposition was relatively successful (Gastón 2010, pp. 38–46). The less-favoured groups mobilized demanding the recovery of common property and peasants’ associations were formed with the aim of collectively purchasing common lands (Lana 2008). In Navarra, for instance, some of these associations established around the resistance against the privatization of common lands became agricultural cooperatives during the 1920s (Majuelo and Pascual 1991, pp. 165–169). In fact, the defence of the common lands was one of the principles of the Cooperatives Federation in Navarra. Similarly, in León, the communal regime not only survived despite of the pressures imposed by the new market economy and the liberal state, but also gave support to new types of “collectivism” in the form of dairy and creamery cooperatives (Serrano 2005, p. 455).

To sum up and according to Greene (2001, p. 153), “social capital would include an entire range of institutions, practices, devices, and learned behaviours that permit individuals and groups to render physical spaces productive and social and cultural spaces agreeable”. Common lands and irrigation communities fulfilled both conditions, thus nurturing social capital and potentially contributing to the emergence of cooperatives. According to Gallego et al (2010, p. 98), the preservation of communal practices may have promoted collective action. Although an explicit link is not proposed, Carmona and Simpson (2003, pp. 234–235) agree that common lands and irrigation communities formed the basis of local cooperation among farmers in the period prior to the emergence of cooperatives. Joining a cooperative demanded the solidarity and unlimited liability of their members when relying

⁸ See Beltrán (2010, p. 22) for a summary of the strategies that local communities employed to preserve their commons.

on loans from banks or credit from input suppliers, which meant that a high amount of mutual trust was needed. It also required avoiding opportunistic behaviour when dealing with the cooperative. Therefore the existence of common lands and irrigation communities may have enhanced the likelihood of the emergence of cooperatives by providing a long-term experience on formal and informal monitoring and enforcement mechanisms, thus facilitating the required mutual knowledge and trust to participate in this kind of collective endeavour.⁹ The diffusion of information about the potential benefits of cooperation was also easier since it could be shared in regular interactions or at more formal meetings. Likewise, past experiences of successful cooperation seem to be an important factor determining future collective endeavours since they provide organizational skills, trust, and a psychological stimulus (Hirschman, 1984; Ostrom 1990; Platteau 2000). Henriksen (1999, p. 68) notes that “some prior experience with self-help organization and in self-governing institutions” was especially valuable when starting a cooperative.¹⁰ If past experiences on collective action are absent, cooperation undeniably becomes a highly demanding endeavour (Ostrom and Ahn 2003, p. xxiv). Common lands and irrigation communities may have therefore increased farmers’ cooperative knowledge and experience in a long-run process of “collective learning” that was beneficial for collective action and economic development, and particularly to the emergence of cooperatives.

3. Methodology

To test the arguments outlined above about the emergence of cooperatives in Spain, a model is built containing the variables that traditionally have been employed to explain this process, together with the potential influence of social capital. Data, available for 44 provinces in inland Spain, have been collected from population censuses, statistical yearbooks, official reports, and secondary sources.¹¹ Apart from shedding light on the ultimate factors that promoted the cooperative movement, this approach has the advantage of comparing areas which were operating within the same legal and institutional context and is thus able to qualify the widely held argument that blames the state for the failure of Spanish cooperatives. It also allows for isolating elements that are not visible in cross-country comparisons.

The importance of cooperatives in every province is measured by the proportion of members over the active male agrarian population in 1923 (Dirección General del Instituto Geográfico y Estadístico 1922; Jefatura Superior de Estadística 1926).¹² Although the first cooperatives were founded in the late nineteenth century, they did not really proliferate until the beginning of the twentieth century. Moreover, the general weakness of the cooperative movement, nonetheless, impeded the consolidation of many of these initiatives

⁹ Reputation mechanisms would be embedded in the functioning of both common-property and cooperative institutions and information would flow in both ways, increasing the costs of defection to potential cheaters since social sanctions would extend from one institution to the other and to the local community in general.

¹⁰ Planas (2003, p. 111) mentions that the lack of cooperative experience could have been a factor explaining the failure of Spanish cooperative movement.

¹¹ Data on the Basque Country are not included due to the lack of information on common lands. The Canary and the Balearic Islands are the other provinces with missing data in some of the variables.

¹² Although the proportion of inputs purchased collectively or the agricultural production marketed through cooperatives may be a better indicator of their importance (Federico 2005, p. 169), there is hardly any data on these issues at the provincial level. The data on cooperative membership should also be regarded with caution given the problems hidden by the official sources (Garrido 1995, pp. 116–117).

(Garrido 2007). Before 1910, 1,559 agricultural associations had been established around the country but 63 percent of them had vanished by 1916. The use of 1923 as the reference date is therefore aimed to account for the consolidation of the cooperative movement. Likewise, a time gap between the dependent and the independent variables is considered in order to identify the conditions that facilitate successful collective action and avoid reverse causality problems. As a result, most of the explanatory variables refer to 1900 as the reference date.

The initial stock of social capital is measured by the importance that common lands and irrigation communities had in the different Spanish provinces at the beginning of the twentieth century. As already argued, the persistence of common lands despite the privatization process greatly varied between different regions, while the existence of irrigation systems reflected old traditions of cooperation in response to environmental conditions. On the one hand, the proportion of agricultural land irrigated by a system of canals and *acequias* in 1914 is employed as a proxy for irrigation communities (Ministerio de Fomento 1918; Gallego 1993).¹³ On the other hand, common lands are measured as the proportion of common lands over the total provincial area (Artiaga and Balboa 1992; GEHR 1994).¹⁴ However, since common lands could be exploited either privately or collectively, this variable is also split up into two by taking into account the fraction of total uses that were being enjoyed privately or collectively (GEHR 1991).¹⁵ The relative importance of these communal institutions in each region is expected to positively influence the emergence of cooperatives.

The hypothesized role of social capital must be tested against other potential explanations. Established accounts on the emergence of Spanish cooperatives point to the existence of economic incentives and the degree of access to land as crucial factors explaining cooperative behaviour. The existence of economic incentives, on the one hand, induced the collective effort necessary to promote cooperatives. Low commercialization levels implied less demand for the services that cooperatives could offer, so the importance of the cooperative movement is expected to be greater in highly commercialized contexts (Carmona and Simpson 2003; Martínez Soto 2003). The fraction of people living in cities bigger than 5,000 inhabitants is employed to account for the existence of market incentives (Tafunell 2005).¹⁶

On the other hand, the existence of a relatively significant group of small and middle-sized farms, providing the size of their plots was large enough, has been regarded as the main explanation behind the geographically diverse success of Spanish cooperative movement (Garrido 2007). There are various reasons for a connection between access to land and the propensity to cooperate. Firstly, although the economic benefits to small and medium landholders seem clear, the same is not true for large landowners that were able to operate efficiently privately (Garrido 2007, p. 191; O'Rourke 2007, p. 1368).¹⁷ Secondly, economic,

¹³ Given that there are no data on agricultural land in 1914, the average between 1900 and 1930 is employed.

¹⁴ See Beltrán (2010) for a more detailed explanation.

¹⁵ The average proportion of these types of user-rights over the commons between 1870 and 1903 is used to avoid unexplained short-run variations. However, the data that distinguish between private and collective user-rights must be taken with caution since their values mixed market and non-market considerations (Jiménez Blanco 2002, p.160).

¹⁶ Other variables accounting for market incentives, such as the importance of commercial crops and industrialization, have also been tested using the proportion of arable land devoted to vines, olive trees and fruit trees and the gross industrial value added per capita (GEHR 1991; Rosés et al. 2010). However, since these variables do not affect the results, they have not been reported here.

¹⁷ However, non-economic motives such as fear of social conflict or the seeking of votes and prestige may have counteracted that trend (see also Planas 2010, p. 69). Interclass cooperation indeed grew in importance after World War I, which implied a push to the cooperative movement (Garrido 1995, p. 134).

social, and political inequality negatively influences a community's cooperative capacity (Boix and Posner 1998). The less-favoured groups, dissatisfied with the existing distribution, will not agree with cooperative arrangements that perpetuate the status quo and the elites, eager to maintain their privileges, will try to prevent any collective action that may undermine it. Although it seems that a minority of large landowners did indeed support cooperatives as a way of preventing social conflict, rural elites generally opposed the cooperative movement in order to secure their control over labour, land, and credit markets (Garrido 2007, pp. 191–192). The widespread poverty of farmers has also been regarded as one of the main factors behind the failure of cooperatives in Spain given their lack of capital and access to credit (p. 190). Furthermore, cooperatives offer no clear benefits to landless peasants (Baker 1999, p. 41). Therefore, high levels of inequality in the access to the land would not promote cooperatives.¹⁸ Access to land is measured as the fraction of landowners and tenants over the agricultural population (Dirección General del Instituto Geográfico y Estadístico 1863).¹⁹ Likewise, to account for the potential negative effect of really small plots, a proxy assessing the average size of plots is also calculated by dividing agricultural land between landholders (GEHR 1994), and is included as an interaction term. Since the existence of a broad layer of small and medium-size farmers has been considered the main factor behind the Spanish cooperatives, these variables are expected to be positively correlated with cooperatives.

Although human capital has been regarded as a crucial element for the emergence of cooperatives in other countries (Henriksen 1999; O'Rourke 2002), its influence has been overlooked in the Spanish case. The positive effects of education on economic development have been widely recognized (Sandberg 1982).²⁰ Regarding its potential influence in the cooperative movement, effective collective action is only achieved when capable agents are also present (Krishna 2002). High levels of human capital facilitate the diffusion of information and the recruitment of local entrepreneurs for cooperative endeavours (Henriksen 1999, p. 60; Svendsen and Svendsen 2004, p. 82). Planas (2003, p. 111) indeed considers that the diffusion of agricultural knowledge was an important, but hidden and therefore dismissed, function of the Spanish cooperatives. It is also important to acknowledge that a high literacy rate also makes possible the recruitment of officials and clerks that can keep the records and deal with the tasks required by the market and official issues. It seems that Spanish agricultural associations employed personnel with hardly any experience in business and accountancy, which surely hindered their possibilities of success (Martínez Soto 2003, p. 146). From a more general perspective, education improves social or cultural skills and promotes the psychological and attitudinal changes congruent with a market economy where change and innovation are pervasive (Schultz 1989). But a modernizing agriculture requires not only an educated, but also a healthy population (Schultz 1964, p. 175). In the nineteenth century, health and strength were as important as literacy or numeracy, especially in agriculture (Horrel et al. 2001, p. 347). Therefore, given the relative backwardness of Spanish agriculture at the end of the nineteenth century and the diverse situation in different

¹⁸ It is also true that this variable may also affect social capital, since the incentives that promote cooperation are more effective among social groups who shared interests and values. Polarization fosters rent-seeking behaviour and reduces consensus and farmer cooperation (O'Rourke 2007, p. 1360).

¹⁹ Given the lack of information for this variable in 1900, data from 1860 must be used. Another option is to use data from 1920 but the source only provides information about landowners and the rest of agrarian population, which makes the distinction between tenants and wage earners not possible.

²⁰ See Núñez (1992, 2003) for an analysis of the Spanish experience.

regions, the peasants' bio-physical welfare should be taken into account when assessing the levels of human capital (Fogel 1993; Martínez Carrión 2002). In this sense, Prados de la Escosura (2008, p. 369) finds that nearly 25 percent of the Spanish population lived below the poverty line of \$2 a day per person in 1900. Educational levels and bio-physical welfare are closely intertwined since a more educated population is more aware of health status and its causes and, consequently, is going to pay more attention to appropriate diets and hygiene habits. Both variables are indeed positively correlated in nineteenth century Spain (Martínez Carrión and Pérez Castejón 2002, pp. 449–450). To prevent multicollinearity problems, the physical quality of life index is thus employed as a proxy for expanded human capital (Morris 1979). This indicator combines literacy, infant mortality, and life expectancy, and has been developed for Spain by Domínguez and Guijarro (2000). Given the homogeneity of the sources from which it is built, this index is highly accurate and extremely helpful to analyse health and educational outputs in developing economies (pp. 114–115).²¹ Human capital is expected to positively influence the emergence of cooperatives.

Lastly, a bunch of controls are also incorporated to account for other potential relationships that may affect the propensity to cooperate. These variables include the importance of the agricultural sector, the settlement pattern, population density, land productivity, total irrigated land, soil quality, and ruggedness.²² A higher fraction of the labour force employed in agriculture reflects economically backward rural societies, where the benefits of cooperation may have been lower. A more disperse settlement pattern may have also reduced the propensity to cooperate by making social interaction and the diffusion of information more difficult. Population density, on the contrary, may have facilitated collective action for the opposite reasons. Land productivity, soil quality, and ruggedness try to control for the expected benefits of cooperation, since not every area, nor every crop, offered the same opportunities to the development of cooperatives (Galassi 2001; Carmona and Simpson 2003, p. 237). Land productivity, in particular, also controls for the potential increase in productivity that either common land or irrigation communities may have promoted not through social capital, but through a different mechanism. Furthermore, the inclusion of total irrigated land also aims to separate the effect that irrigation *per se* could have had on agricultural organization and productivity from the effect of the management of irrigation systems by irrigation communities.²³

²¹ See Federico and Toniolo (1991) for an analysis of this index in different European countries. Zamagni (1989, p. 125) has indeed encouraged a more widespread use of this indicator among economic historians.

²² While the agricultural sector is measured by the proportion of the active population working on agriculture, population density divides inhabitants by the geographical area and the settlement pattern refers to the number of settlements (*caseríos* are not counted as settlements) per 100 km² (Dirección General del Instituto Geográfico y Estadístico 1902, 1904; INE 2001). Land productivity is obtained by dividing agrarian output by productive land, while total irrigated land refers to the fraction of agricultural land irrigated by any means (Ministerio de Fomento 1918; Gallego 1993). The ruggedness index quantifies terrain irregularity by combining the altitude between neighbouring cells using GIS (Goerlich and Cantarino 2010). Lastly, soil quality is a measure of a province's suitability for agricultural purposes. This variable combines climate, soil, and terrain characteristics measured by the FAO's Global Agro-Ecological Zones available at <http://www.iiasa.ac.at/Research/LUC/GAEZ/index.htm>. This geographic raster data are converted into one variable at the provincial level by taking the average of the points within that territory. See Fenske (2011, p. 10) for a more detailed explanation of this procedure.

²³ The land irrigated by canals and *acequias*, managed by irrigation communities, constituted 55 percent of the total irrigated land.

4. Results

Table 1 reports the results of a series of OLS cross-section regressions testing the hypothesis outlined above. Columns (1) and (2) report the baseline specification, relating the importance of cooperatives with the variables that account for social capital, as well as to those regarding market opportunities, access to the land and human capital. Column (3) includes the different controls explained above. The high explanatory power of the model should be stressed, since it explains 83 percent of the variation of the dependent variable. The variables assessing social capital have a highly significant statistical influence on the emergence of cooperatives in early twentieth century Spain. The existence of irrigation communities is strongly correlated with the propensity to cooperate. The relationship between common lands and agricultural associations is more complex since, although common lands *per se* are not significant, there is either a negative or a positive statistically significant link depending on the importance of collective practices on the commons. In those areas where the local community was more involved in the use of the commons, the importance of cooperatives was higher. However, when commons were enjoyed privately, their influence was negative, indicating the presence of powerful elites that monopolized these resources, not only preventing the building of social networks around them, but also increasing inequality. This

Table 1. *The emergence of cooperatives in early twentieth century Spain*

	Dependent variable: membership of agrarian cooperatives 1923				
	OLS			IV	
	(1)	(2)	(3)	(4)	(5)
Common lands	-0.041 (0.072)				
Common lands × collective uses		0.030 (0.069)	0.357*** (0.098)	0.258* (0.143)	0.542** (0.255)
Common lands × private uses		-0.355* (0.182)	-0.574*** (0.110)	-0.723*** (0.254)	-0.675*** (0.131)
Irrigation communities	0.565*** (0.166)	0.676*** (0.171)	0.363** (0.147)	1.634*** (0.469)	0.569 (0.457)
Physical qual life index	0.803*** (0.150)	0.745*** (0.140)	0.535*** (0.102)	0.656*** (0.195)	0.457*** (0.149)
Urbanization	0.191** (0.083)	0.244*** (0.085)	0.091 (0.106)	0.428*** (0.156)	0.109 (0.129)
Access to land	0.198 (0.137)	0.277** (0.127)	0.076 (0.090)	0.521** (0.212)	0.135 (0.147)
Access to land × aver. plot size	0.005 (0.005)	0.007 (0.005)	0.009* (0.005)	0.016** (0.007)	0.011** (0.005)
Controls	No	No	Yes	No	Yes
Observations	44	44	44	44	44
R ²	0.54	0.57	0.83	0.24	0.80

Robust standard errors between brackets: *, **, or *** denotes significance at 10, 5, or 1 percent level. For simplicity, the intercept is not reported. Controls include population density, agricultural population, settlement pattern, land productivity, irrigation, ruggedness index, and soil quality.

outcome points to the destruction of social capital brought about by the privatization of both property- and user-rights carried out throughout the nineteenth century.

The incentives to cooperate seem to be enhanced by the presence of a wealthy market, as shown by the positive correlation between urbanization and the dependent variable, although its effect is not significant when different controls are included. Apart from stressing weak internal demand as a key constraint on Spanish modernization, this may be explained by the deficiencies of the urbanization proxy to account for long-distance trade. In this sense, the low cooperative success of North-western Spain, specialized in perishable dairy products and meat, may be due to the long distance to the main markets and the high transportation costs (Carmona and Simpson 2003, p. 256). Resorting to foreign markets of dairy products and meat was also limited by protectionism since, by increasing the relative cost of cattle fodder, it impeded the region's ability to compete efficiently, thus closing the path that Denmark, for example, had followed (Van Zanden 1991, p. 232).

The variables that represent access to the land, either the fraction of landholders or its interaction with the average size of the plot, appear to have had a significant impact on cooperation rates. In this regard, it is not only important that access to land was widespread, but that the plots worked by farmers were large enough to provide sufficient financial resources to secure their operations. This result does support previous interpretations that stress the importance of a wide layer of small, but especially medium-size farmers, as a condition to cooperate (Garrido 2007). In this sense, the extreme land fragmentation of northern Spain could have been a barrier due to the farmers' lack of capital. In addition, the estimated effects of inequality may be downward biased for two main reasons. Firstly, in those regions where access to land was more concentrated, cooperatives may have been over represented since the extreme poverty of their members led to low levels of activity and a high degree of failures despite, their initial proliferation. This effect is perhaps not reflected in the data (Garrido 1995, p. 134). Secondly, there is a wide consensus that, although the geography of land inequality did not vary due to the privatization of common lands from 1860 onwards, the gap between regions increased (Rueda 1997, p. 66). Therefore, employing data on 1860 instead of 1900 may also produce a downward bias in the estimated coefficients.

Lastly, the physical quality of life index shows a highly significant and positive correlation with the propensity to cooperate. The high levels of human capital in northern Spain thus contributed to the emergence of cooperatives. This result should be stressed since the role of human capital, although important for other countries, has been overlooked in the Spanish case.

Therefore, the OLS estimates show a positive effect of the existence of collectively used resources on the emergence of cooperatives.²⁴ However, it may be the case that an omitted variable is correlated with common lands, irrigation communities, and cooperatives, thus biasing those results. To overcome the identification problem, an instrumental variable approach is employed, which exploits the variation in collectively used natural resources that

²⁴ The estimated magnitudes of the relationship between collective resources and cooperatives are not only statistically significant, but also economically important. A one standard deviation increase in the stock of collectively used common lands and irrigation communities is associated with a 0.61 and 0.24 standard deviation increase in the importance of cooperatives in 1923, respectively. On the contrary, the presence of privately used common lands negatively affected the building of cooperatives by 0.30 standard deviations. Lastly, high levels of human capital and access to land (interacted with the plot size) are also key elements in sustaining the cooperative movement (standardized beta-coefficient of 0.48 and 0.27, respectively).

arose from differences in each province's climatic conditions. This strategy has the added benefit of yielding potentially consistent estimates even though collectively used lands and irrigation communities may be measured with error.²⁵

On the one hand, it has been argued that climate constraints are correlated with the persistence of common lands in Spain (Beltrán 2010, p. 25–27). Given that the lack of water constituted the primary constraint on Spanish agricultural yields, if production needed to be increased, the only available choice was to expand arable land, predominantly at the expense of common lands. The need to expand arable land was lower in humid Spain, since without this restriction production could be increased through a more intensive use of the territory. The persistence of collective lands in humid Spain was thus partly caused by the greater capacity of its agriculture to increase production, without resorting to the expansion of arable land, and by the function that the commons themselves fulfilled to support these high agricultural yields by supporting livestock that could provide fertilizer and workforce. The average annual rainfall is therefore employed as an instrument for collective lands.

On the other hand, irrigation systems and the irrigation communities that managed them historically developed with more intensity in those areas where rainfall was scarce and greatly diverged between seasons and where floods episodes appeared more frequently (Pérez Picazo and Lemeunier 1990, p. 28; Domínguez 2002, p. 110). These infrastructures aimed at both regulating the river basin (thus lowering environmental risks) and facilitating irrigation. Consequently, an index interacting average annual rainfall and intra-annual variability of precipitation, measured by the coefficient of variation of monthly rainfall, is employed as an instrument for irrigation communities.

Built using long-term climate series data from 1901 to 2002 (Goerlich 2010), both instruments are clearly exogenous and thus plausibly uncorrelated with the propensity to cooperate. Although this condition is difficult to test, the history of the development of cooperatives in Spain supports this claim since it does not seem that climate constraints affected the emergence of cooperatives. A potential concern is that both instruments influenced the emergence of cooperatives through their impact on agricultural productivity instead of through the social capital promoted by collectively used resources. This issue is addressed by controlling for soil quality, ruggedness, and agricultural productivity. This identification strategy relies on the assumption that, holding everything else constant, environmental constraints impact the emergence of cooperatives only through the existence of common lands and irrigation communities.²⁶

Columns (4) and (5) in table 1 report the results of the IV regressions. Both instruments show a highly significant relationship with the instrumented variables in the first stage. The IV estimates hardly change the results obtained by the OLS regressions, contributing to support the hypotheses argued here. However, although the influence of collectively used

²⁵ The measurement error that may exist in the dependent variable, even though less worrisome in terms of endogeneity, is also addressed by the use of instrumental variables.

²⁶ Using a cross-sectional data set of countries, Felis-Rota (2010) argues that temperate climates enjoy higher levels of social capital, which would affect the identification strategy explained above. However, including the temperature deviation from the national average, together with rainfall and altitude (Instituto Nacional de Estadística 2001; Goerlich 2010), does not affect the results reported here. In fact, none of the climate variables is shown to be statistically significant. Therefore, the argument that climate conditions may promote social capital and contribute to the emergence of cooperatives is not supported in this case. In fact, what the instrumental variable approach shows is that certain environmental features can facilitate the existence of particular institutions, but only when these institutions are in place, can social capital be generated and sustained.

lands on the propensity to cooperate is clearly shown in the IV estimates, the effect of irrigation communities becomes insignificant after including controls. It may be possible that the hypothesized positive role of irrigation communities on social capital has been overstated. According to Garrido (2012), British and French reports carried out in the nineteenth century misunderstood the democratic functioning of irrigation communities in Spain, and their works greatly shaped the image that social scientists have of these institutions today. Attending the irrigators' assemblies required owning irrigated land and only a minority of farmers fulfilled this condition. It was also commonplace that the ordinances stated that only landowners who owned a certain amount of irrigated land could be members of these committees. In addition, an important share of irrigated land became increasingly owned by urban investors, a trend which accelerated in the nineteenth century. The interests of large landowners thus dominated the functioning of these institutions. However, despite all these limits to a more widespread participation, Garrido concedes that it is possible that most irrigators did have a high degree of indirect involvement (p. 49). In this sense, the insignificance of the irrigation communities' estimates in the IV regression is perhaps due to the statistical effect of losing degrees of freedom when adding more control variables and the complexity introduced by the instrumental variable procedure itself. Its p-value on column (5) is indeed only 0.223. The consistency of the OLS and IV estimates makes it unlikely that the positive relationship between collectively used resources and the emergence of cooperatives is due to omitted variable bias. Performing a Hausman test shows that differences in OLS and IV estimates are not systematic. If endogeneity is not an issue, OLS estimators would be preferred since the 2SLS approach increases the variance of the estimators. This supports the argument that the non-statistical significance of the irrigation communities' IV estimates when controls are included is due to high standard errors. This interpretation is consistent with the high explanatory power of the model which only leaves 17 percent of the variation of the dependent variable unexplained.

5. Conclusion

The existence of collectively used resources, especially common lands, contributed to the emergence of cooperatives in early twentieth century Spain by providing the social networks that facilitated the diffusion of information and the building of mutual knowledge and trust. In this sense, the case of common lands is particularly illuminating since its positive effect on collective action is only visible when the access to them had not been privately appropriated. The longstanding traditions of local cooperation around these collective resources were weakened during the transition to capitalism by both the expansion of markets and the intervention of the state. The privatization process that from the eighteenth century affected not only their property rights, but also the collective practices over the surviving commons, had unintended consequences for economic development by negatively affecting the possibility of resorting to cooperation mechanisms different from the market. Although there is no uniform recipe to promote collective action at the local or regional level, this paper has tried to stress the importance of local social networks. However, the macro links explored here must be complemented by analysing the mechanisms that account for these relationships at the micro level.

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