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AN ECONOMETRIC MODEL**

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De conformidad con la base quinta de la convocatoria del Programa de Estímulo a la Investigación, este trabajo ha sido sometido a evaluación externa anónima de especialistas cualificados a fin de contrastar su nivel técnico.

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FACTORS BEHIND THE PRESENCE OF AGRICULTURAL CREDIT COOPERATIVES IN SPAIN, 1900-1935: AN ECONOMETRIC MODEL

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Abstract:

This paper analyzes the factor determining the presence and spread of agrarian credit cooperatives (rural savings banks) in Spain during the first third of the 20th century. We first provide descriptive evidence on the evolution of the number of agricultural cooperatives and then we analyze their economic and financial activity. We emphasize that the role of the public sector in this process is not always positive. Panel data estimates attest that the number of credit cooperatives is higher in regions with a higher number of potential competitors, i.e. saving banks and public granaries, also called *positos*. We also find that the higher the number of competitors in a year, the lower the number of cooperatives in the next year. As expected, the level of literacy of the population in a region determines the presence of credit cooperatives in that region.

Keywords: credit cooperativism, rural savings banks, Spain

JEL: G29, N53, Q13

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1.- INTRODUCTION.

The beginnings of the 21th Century have been fertile ones for the historiographer of Spanish cooperativism. Recent years have seen an increase in scholarly contributions to the wealth of knowledge in this matter. While not seeking to be in any way exhaustive, we would highlight the studies by Simpson (2000), Carmona Pidal (2000), Gómez Herráez (2003). In 2003 the journal CIRIEC published a single-theme issue entitled “Cooperativismo y economía social: perspectiva histórica” coordinated by S. Garrido, which included studies for various spheres and types of cooperativism. Among these, there were two devoted to agriculture, one of a general nature by Garrido himself (2003) and another, dealing specifically with agricultural credit cooperativism, signed by Martínez Soto (2003). Other studies worth mentioning include Martínez Soto (2003b), which makes a deep study of workings of the agricultural credit cooperatives; Garrido Herrero (2007) provides a general analysis of the factors which prevented the cooperativism from succeeding in Spain; Martínez Rodríguez and Martínez Soto (2008) review the history of thought on agricultural cooperativism in Spain; Planas Maresma (2010) offers a social and political view of agricultural cooperativism; and Fernández García (2010) published a comparative study on the success of cooperativism from an international perspective.

The wide range of subjects and questions that have been addressed recently coincides with the issues being broached internationally and highlights the limited success cooperativism has enjoyed in Spain in sectors where it has clearly triumphed abroad, such as in commercialization or industrial processing. Noteworthy is the late development of the winegrowing cooperatives due to their difficulties in accessing marketing channels for the product (Simpson, 2000; Simpson, Carmona, 2003); and the impact of associationism and the various manifestations of social economy in the life of farming areas (Gómez Herráez, 2003).

The specific subject matter of these studies varies, as do the samples analysed and the slant of the arguments. Yet there is one element in which all the above coincide – the difficulties faced by the cooperative movement in carving out a deep, sustainable position in the country's economy. Indeed, this has led several authors (Carmona, 2000; Martínez Soto, 2003a; 2003b; Garrido 2003, 2007; Martínez Soto and Martínez Rodríguez, 2008) to refer in their writings to the relative failure of Spanish cooperativism in its various facets (consumption, credit, production, etc.) even though the number of entities was hardly dismissible. These researchers point to the actions and attitude of the State, the problems of managing and supervising the cooperatives, the problems that “benevolent” financing entailed and the limited capacity to attract members with high resources as being negative factors in the implantation and sustainability of the cooperatives.

The studies cited lack any econometric multicausal analysis that might go beyond a merely qualitative interpretation and the intuition of the direct causality of individually analysed factors. In this vein, there is a very interesting contribution by Fernández-García (2010), whose regressions for different Western European countries and America show that the spread of the

cooperatives was greater in countries with greater human capital, in more specialized sectors that were oriented towards international markets and where the land ownership structure was of a predominantly family nature. Multicausal analysis extended understanding of the phenomenon and the more robust results obtained led to posing hypotheses that went beyond qualitative intuition based on specific cases.

The main aim of our study is to analyse the factors that affected the implantation and spread of agricultural credit cooperatives (rural savings banks) in Spain during the first third of the twentieth century. First we provide a descriptive analysis of the evolution of the cooperatives in the period in question and then move on to detail their economic and financial activity. We have also gone into the role of the State, which in Spain in particular was not always very positive. Finally, we draw up an econometric analysis to measure the weight that a selected set of variables may have had in the peculiar implantation of the credit cooperatives in Spain. The article ends with the conclusions ensuing from the econometric analysis and the importance of such variables on the implantation of credit cooperativism.

2. CREDIT COOPERATIVES IN SPAIN: DESCRIPTION OF THEIR EVOLUTION DURING THE FIRST THIRD OF THE TWENTIETH CENTURY.

The effects of the Great Depression at the end of the nineteenth century, brought about to a large extent by the competition of cheap cereals from Russia and the United States, on European farming triggered off a movement towards modernization in farming in some countries. The cooperatives began their spread through Western Europe from 1870, as they were a means within the reach of the family businesses to bring in the technical changes that would improve their productivity and access to markets. This process was not uniform within Europe and there was a strong correlation between technical innovation and the development of cooperativism. Bieleman (2001) highlighted this connection in Holland, although this author points out how little is known about how this interrelation came about. This paradox was not limited to Holland. There is a general lack of statistics for quantifying the economic significance of agricultural cooperativism in the sector as a whole¹. Such a situation does not make it easy to compare the impact of the agricultural cooperatives on the different types of farming in Europe². However, what is known are the different intensities and speeds at which the cooperatives developed in the various European countries and regions. As Van Zanden (1991, p.237) points out, the majority of farmers in the Netherlands, Scandinavia, Germany, Switzerland, Ireland and some of the Eastern European countries were participating in cooperative movements at the beginning of the twentieth century, although the same was not true in Great Britain, France, Italy, Spain or Portugal. A closer look reveals that this does not hold true for France and even

¹ Doving (1965, p. 211) was already indicating the problems of the sources and statistics about agrarian cooperatives.

² Van Zanden (1991) made an interesting study on the farm productivity of sixteen European countries between 1870 and 1914, but was unable to go beyond some vague allusions towards the weight of cooperativism and could not use these as an argument to explain the reasons behind the different national productivities.

for Southern Europe (Italy, Spain, Greece and Portugal), where regional characteristics come into play³.

Agricultural cooperatives were slower to get off the ground in Spain than in the Western European countries. The first appeared in the last 1890s under the Associations Act of 1887 and began to take off thanks to the enactment of the Agrarian's Syndicates Act of 1906, which granted them important tax exemptions. Worthy of mention is the role played in this process by the Catholic Church⁴, which from the end of the nineteenth century had been undertaking a campaign to group together small farmers in cooperatives with the aim of controlling them and preventing them from falling under the bad influences of other political and social movements (socialism, anarchism, republicanism, etc.) which were highly active in rural Spain at the time.

The Spanish agricultural cooperatives adopted the form of "Sindicatos Agrícolas" (Agrarian Syndicates) following the French model (and denomination), although the specifically credit-oriented ones were known as "rural savings banks". There were other associations capable of setting up cooperatives, for example, the "Comunidades de Labradores" (Farmers' Community) and the "Cámaras Agrícolas" (Agrarian Chambers). Both of these were of a semi-official character and the latter acted as lobby groups for the interests of the large owners, trying to attract other groups by offering services which included cooperatives⁵. There were also a number of cooperatives of socialist, anarchist or republican affiliation called "agrarian associations", which sought to remain outside the reach of the 1906 Act, which had envisaged a cooperativist, interclassist and conservative model. Finally, the agrarian federations acted as second degree cooperatives, at provincial and regional level, and brought together all types of agrarian organizations and associations, offering them cooperative services, in the main the purchase of fertilizers and credit.

Table 1 shows that the number of agrarian associations of almost any type substantially increased in Spain between 1910 and 1933. The first decade of the 20th century proved favourable for funding cooperatives and these associations proliferated throughout the country. By 1910 there were already 1,559 agrarian syndicates and 516 rural savings banks. But the lives of these early cooperatives were very short, and 63 percent had disappeared by 1916⁶. The number of syndicates steadily grew, though, from 1,559 in 1910 to 6,813 in 1927. Its number increased at a considerable growth rate in the first third of the 20th century, particularly so from 1915 onwards, due to the higher protection executed by the Government. Anyway, it must be highlighted that it were landowners and the Catholic Church who pressed to fund their own associations as a way to limit the spreading of socialist and anarchist ideas in rural areas.

³ On these cases, see Garrido (2007) and Martínez Soto (2003) for Spain; Fonseca (1985) for Portugal; Galassi and Cohen (1994) and Sapelli (1981) for Italy and Gousios and Zacoboulou (1992) for Greece.

⁴ On the activity of the Catholic Church in the development of agricultural cooperativism, see Castillo (1979); Cuenca (2003); Garrido (1996); Majuelo and Pascual (1991) and Martínez Soto (2000).

⁵ On the Agrarian Chambers and their actions see Planas Maresma (1998) on those in Catalonia.

⁶ Garrido (2007, p. 185).

The fall registered in 1933 was due to the fact that the Ministry of Agriculture purged the statistics by removing many of the cooperatives about which it did not have reliable data. The most striking figure is that in 1933 there were 4,266 syndicates, of which over half had been founded in 1926 (Garrido, 2007, p.185), which shows the extreme fragility of the Spanish cooperatives, which, unable to offer useful services to their members, disappeared.

The rural savings banks proved to be more solid and lasting than the other cooperatives, as we will see in more detail below. The percentage of survivors in 1916 of those founded in 1910 was at 78 percent. This figure remained quite stable between 1910 and 1927 with the greatest increase being recorded between 1927 and 1933, when growth reached 20.1 percent, probably because the figure includes the credit sections existing within the cooperatives themselves.

Farmers' Agrarian Communities and Agrarian Chambers were semi-official organizations created by landowners that could settle agrarian and credit cooperatives. Both institutions had a specific number of duties, according to their Regulations. Their number was small and their activity was quite stable throughout the period. The Agrarian Associations were formed by a miscellaneous group of organizations like secular cooperatives, scientific institutions, and even leisure organizations. The Agrarian Associations followed the Associations Act of 1877 and they doubled their number during the sample period.

Table 1. Agrarian associations in Spain (1910-1926)

| | 1910 | 1915 | 1918 | 1923 | 1927 | 1933 |
|-----------------------|-------|-------|-------|-------|-------|-------|
| Agrarian syndicates | 1.559 | 1.530 | 4.892 | 5.180 | 6.813 | 4.266 |
| Rural Savings Banks | 516 | 517 | 503 | 499 | 501 | 646 |
| Farmers' communities | 85 | 100 | 132 | 123 | 138 | 132 |
| Agrarian chambers | 100 | 106 | 126 | 126 | 125 | 125 |
| Agrarian associations | - | 660 | 857 | 987 | 1.009 | 1.254 |
| Agrarian federations | - | 24 | 77 | 78 | 96 | 128 |

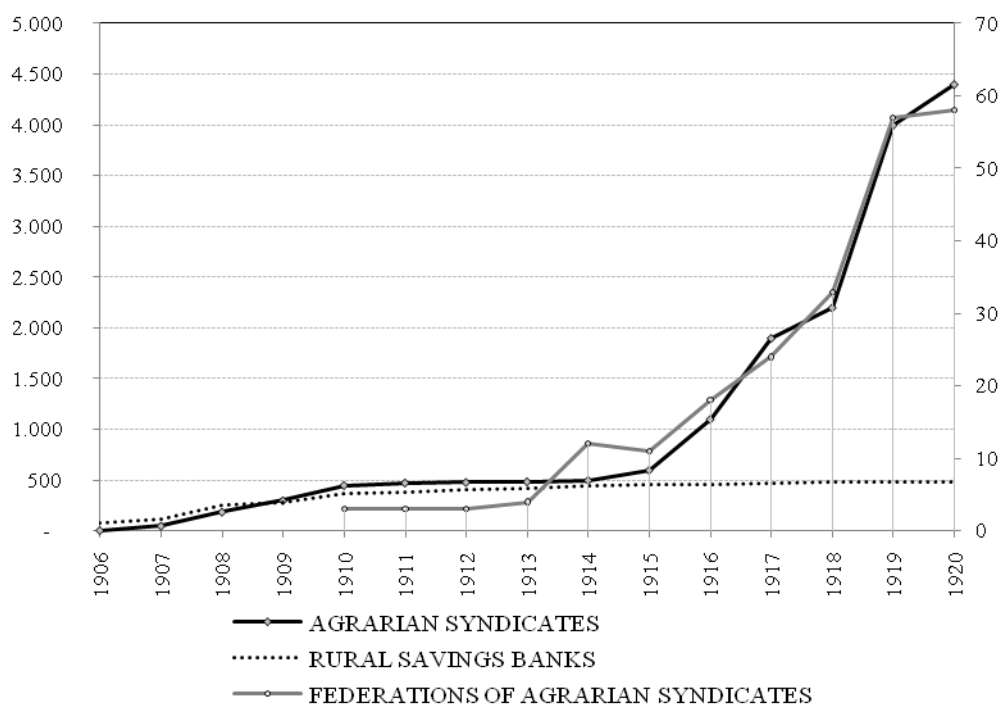
Source: Own elaboration. Data from: the Ministerio de Fomento (1911) for 1910; Anuario Estadístico de España (1915) for 1915; Dirección General de Agricultura (1918) for 1918; L. Muñiz (1923) for 1923; Anuario Estadístico de España (1927) for 1927 and Dirección General de Agricultura (1934) for 1933

2.1. The spread of agricultural credit cooperativism in Spain.

In the face of social changes occurring in the agrarian sphere and the ensuing conflicts, the Spanish Catholic Church, and more specifically its social policy bodies, undertook various initiatives to prevent less favoured groups from joining the new political and union organizations that were questioning the existing social and economic order. Social Catholicism favoured a German inspired model of confessional credit cooperative - the Raiffeisen model - as a useful tool to apply its political, social and economic strategies. Through its social bodies, the Catholic Church pushed ahead in founding agrarian cooperatives, and between 1904 and 1910 it created a total of 373 rural savings banks and 450 farming syndicates, as Graph 1 shows. In 1917 the Catholic cooperatives took a further step in their organization with the founding of the Confederación Nacional Católico-Agraria (CNCA), whose confederate credit savings bank was

set up as a public limited company with the capital of 5 million pesetas being put up by the provincial federations. The CNCA claimed in its report of 1920 that it numbered 4,401 farming syndicates, 58 provincial federations of cooperatives and 450 rural savings banks, with capital deposits of 14.2 million pesetas, and that it had granted loans to the tune of 12.7 million pesetas.

Graph 1. Catholic cooperatives, 1906-1920



The absence of any legal resolution that favoured the implantation of these credit cooperatives hindered their development until 1906, when the Agrarian Syndicates Act was passed and its subsequent regulation in 1908 served to change the situation. This Act, influenced by the French Agrarian Syndicates Act of 1884, was the basis to create associations of agrarian agents (owners and growers). These organizations could act as mixed agrarian cooperatives, focusing on production, marketing and purchase of inputs, among other activities, and could also deal with the credit activity of a cooperative, an independent rural savings bank, that is, an agrarian credit cooperative. The law also allowed for the independent functioning of agrarian credit cooperatives under the name of Rural Savings Banks. The tax exemptions envisaged under these rulings were systematically blocked from the Ministry of the Exchequer and especially from the Dirección General del Timbre (Deputy General of Stamp Office)⁷. This

⁷ On this problem, which increased the costs of the operations rural savings banks, see Chaves Arias (1907, p. 74) and onwards. According to this author's analyses, a small, personally guaranteed loan of 100 pesetas for one year at 4% rose, with taxes, by 3.23 pesetas; a deposit of 100 pesetas at the savings bank supposed a cost of 2.69 pesetas in taxes; the cancellation of a loan was 2.96 pesetas.

fiscal policy upped the costs of the operations of the rural savings banks and made it harder still for them to be sustainable.

The greatest success for the Raiffesian model came in the region of Navarre⁸ on account of the support received from the local clergy, the bishopric and, in some cases, from the large owners. One of the keys in the consolidation of the Navarre cooperative savings banks was the creation of a Diocesan Board and the development of an organizational project with three tier coordination: local, district and provincial savings banks. The existence of a second level of bodies was a distinguishing factor with respect to other regions where the structure of the institutions did not rise above the local level. By 1908 the region already boasted 130 rural savings banks serving 346 towns, with more than 14,000 associated families, all of which were connected up through a network of 57 agrarian syndicates that numbered some 5,600 members⁹.

Another important nucleus of non confessional or, rather, “neutral” credit cooperatives¹⁰, arose in Extremadura¹¹. This group of savings banks did not limit itself to acting as just savings banks and providing loans, but also undertook actions proper to farming syndicates (purchase of machinery, breeding animals, seeds, chemical fertilizers, deposit and common sale of harvests, rural vigilance, insurance and settlement, although credit operations remained the backbone of their work. This type of rural financial institution was an initiative of the large and medium size owners, who put up important amounts of capital, making them the rural savings banks with the most capital in the country from 1890 to 1934. From the outset they used novel financial technology and were managed by paid professionals, which was a positive factor in their business consolidation. Even the directors of these cooperatives were, on many occasions, directors of agrarian businesses. The great solvency and the guarantees built up by the Badajoz entities made it easier for them to obtain support from the Bank of Spain and they became the entities with largest credit from the central bank.

2.2. Territorial distribution: spatial analysis

The rural savings banks managed to set up in most of Spain, although distribution was very uneven between the different provinces. From the maps in Figure 1 it can be seen that the

⁸See Majuelo Gil and Pascual Bonis (1991) and Pejenaute Goñi (1989; 1992).

⁹ The Navarre cooperatives were pioneers in disseminating chemical fertilizers through common purchases, so fostering their acceptance among small businesses in the region; by 1910 more than half of the Navarre municipalities (143 of 269) had a rural savings bank. The creation of a coordinated organization culminated with the founding that year of the Federación Católico-Social de Navarra, the most solid Raiffesian nucleus in the country of its time.

¹⁰ The term “*neutral*” designated those cooperatives that were not associated to any specific political or religious movement. In general, they were made up of large and medium sized farmers with sufficient resources to put up the necessary capital to gain easy access to outside sources of public and private financing (Bank of Spain, private banks, Banco Hipotecario). These credit cooperatives have also been studied by F.A. Martínez Gallego (2000).

¹¹ On this group, see Asociación de Agricultores de España (1911) and N. Noguer (1913, pp. 511-512).

centres of most importance in terms of numbers of savings banks were in the regions of Navarre, Castile-Leon and Catalonia, followed by Extremadura, Aragon, Asturias and Castile-La Mancha. A look at the maps showing the spatial implantation in terms of purely institutional presence (number of cooperatives) shows how during those years there were three dominating features: areas of strong implantation in the Mediterranean, from Gerona down to Murcia; Navarre, Asturias and some of the provinces of de Castile Leon; areas of medium implantation made up of Extremadura, Cantabria, the western provinces of Castile-Leon and the Balearics; and, finally, the low implantation areas of Andalusia, Galicia and Castile-la Mancha.

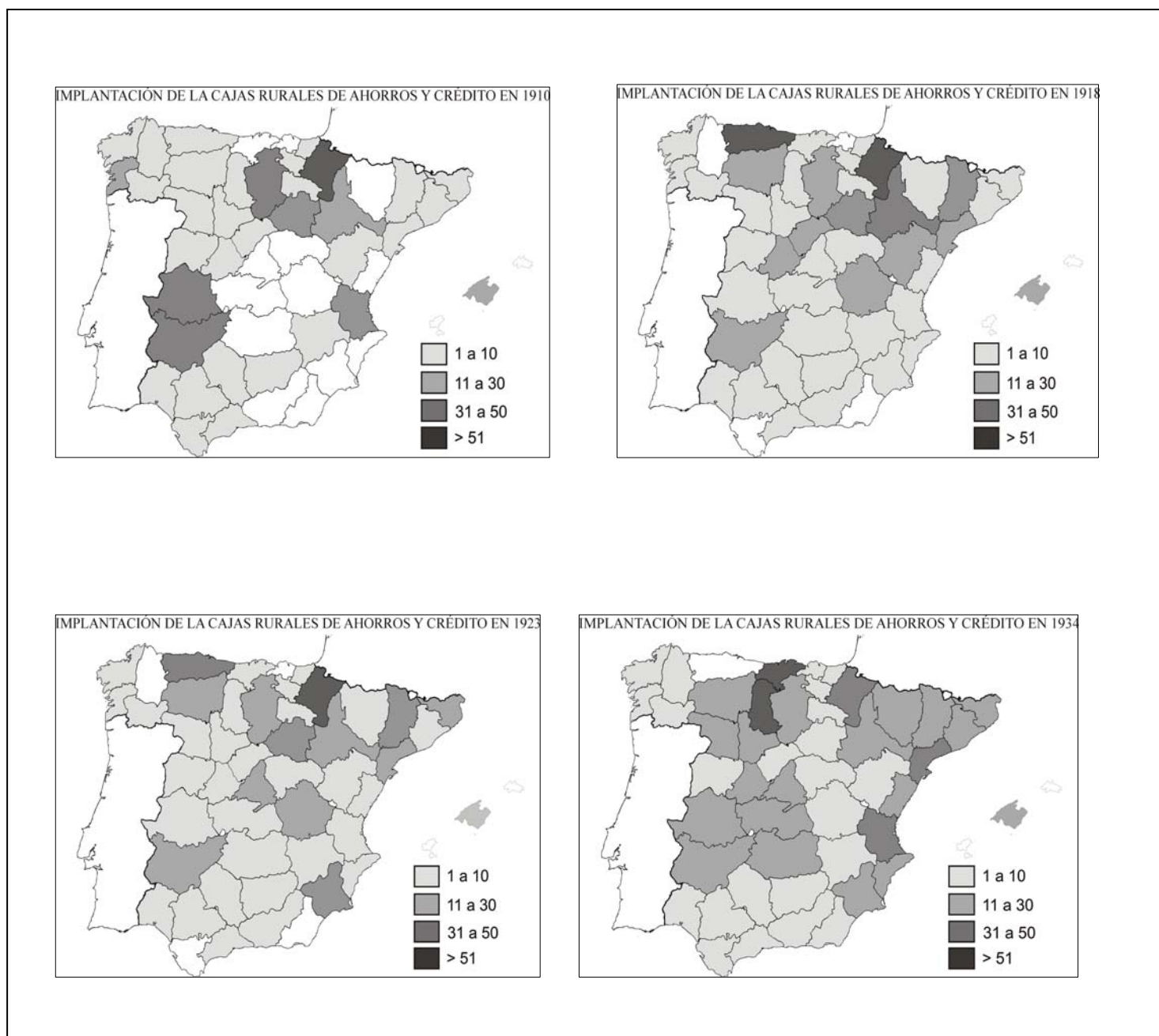
Despite the weakness of agricultural cooperativism in Spain, some regions and provinces did manage to achieve strong, viable and sustainable cooperatives that were devoted in the main to buying and selling fertilizers and granting loans. This was the case of the Mediterranean areas of irrigation¹² (Catalonia, Valencia and Murcia), where there was a highly commercial agriculture oriented towards exports, and in the north, which the specialized cattle rearing was the main activity. In these cases, the cooperatives were set up in farming towns, with more than 1,000 members and with a heterogeneous base that ranged from big owners to small farmers, and even landless labourers. What gave them their great stability was that they included a number of associates from medium size family businesses that were in a position to save.

High implantation was also achieved in the central-north (Castile-Leon), which was the main cereal producing area of the country, although in this case the cooperatives were made up mainly by poor country folk, which meant that the businesses were very unstable and had little economic repercussions on their areas.¹³

¹² Garrido (1996) for Valencia; Martínez Soto (2000) for Murcia; Planas Maresma (2003) for Catalonia; López (1995) for Galicia and Domínguez Martín (2001).

¹³ For Castile and Leon, see Carasa Soto (1991; 2001).

Figure 1. Implantation of Rural and Credit savings banks between 1910 -1934



Source: Own elaboration. Data from: the Ministerio de Fomento (1911) for 1910; Dirección General de Agricultura (1918) for 1918; L. Muñiz (1923) for 1923; and Dirección General de Agricultura (1934) for 1933

3. WHAT DID AGRICULTURAL COOPERATIVES DO?

Recent studies on agricultural credit cooperatives in Germany, Italy, Ireland or Denmark¹⁴ have highlighted a repertoire of problems common to this type of body which stem from the way in which they functioned. These entities only performed very simple banking operations, loans in the main. They kept very high reserves with figures of over 90% in deposit liabilities, unlike other urban entities, such as the savings banks. Most transactions were done in cash and were distributed through loans. These practices had three types of risks (Guinnane, 2001, p. 43): fraud, in the form of embezzlement by some of those involved (especially treasurers) of entities resources either by theft of cash or by making changes to the book entries; carrying out operations of clearly private interest, such as granting loans to persons with dubious records who had some link with managers; thirdly, there were difficulties in maintaining the book entries in order. These reflected entries and outgoings and errors in management were the result of rather unfortunate strategic decisions for the rural savings banks, and were generally due to the low level of preparation of their directors.

The provision of efficient, sustainable financial services that were within the reach of rural populations implied the fulfilment of a series of conditions, in particular the reduction of transaction costs, which were difficult to meet given the possibilities available to credit cooperatives during the years mentioned. In the first place, we would underline the difficulty of establishing “healthy” credit relations, and how costly it was to accumulate “information capital”¹⁵ about customers, which supposed considerable social cost for initiatives of a private nature. The consolidation of associationism helped in this task. Credit was highly important for the economic growth of agriculture, but it was only effective when real opportunities for production existed which small farmers could not take advantage of using only their own resources. Financing in itself could not create production opportunities, but it could foster them.

Some of the obstacles of financing small farmers were overcome through microfinancing by credit cooperatives, public granaries, rural savings banks and other savings banks, which in some areas (Navarre, Valencia, Murcia, etc.) returned reasonably good results in terms of cover and sustainability, so enabling them to increase their offer of credit services to customers with scarce resources. The main problem was risk estimation and understanding the circumstances surrounding it. Entities that were willing to assume the risks involved in granting loans were faced with a complicated situation for many reasons. First, they often had incomplete or incorrect information about the customer. Securing further information to improve risk evaluation was neither simple nor cheap, and cooperatives which had opted for the

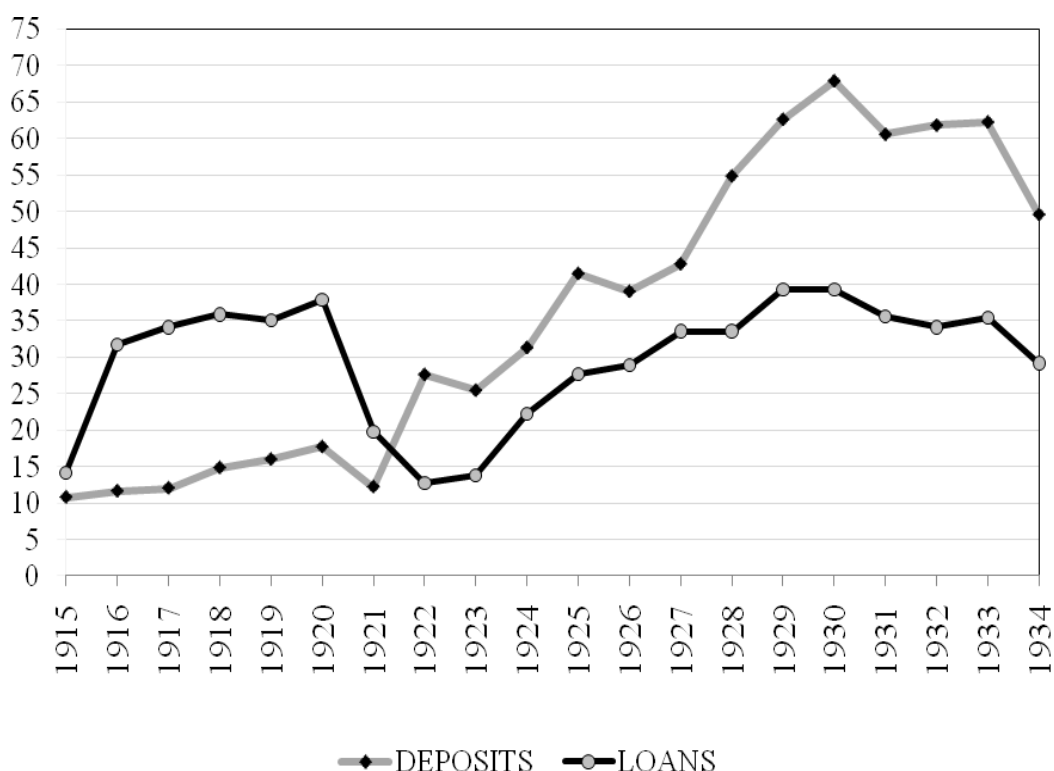
¹⁴ For Germany, see T. Guinnane (1993), (1994), (1997), (2001), (2001b), (2009) and A. H. Kluge (1991); for Italy, see F. Galassi (1997) and G. Muzzioli (2001); for Ireland (1994b) and for Denmark, see T. Guinnane and I. Henriksen (1998).

¹⁵ On this subject there have been a number of recent studies of the microcredit institutions which have sought to establish the importance of “information”: G. Seravalli and S. Caselli (2000); S. Larivière and F. Martin (1999); C. González-Vega (1998); S. Navajas (1999), among others.

Raiffeisen system resorted to syndicate control mechanisms which proved highly effective. If the effort was too expensive, the entity did not grant the loan.

Most rural savings banks during the first period, 1900-1915, were devoted mainly to providing credit for their members. In general their actions were very limited, running to microcredit operations according to the deposits of their members (graph 2). They also took the first steps towards seeking external financing, although this path had the evident restriction of the limited funds of most entities.

Graph 2. Deposits and loans of the rural savings banks, 1915-1934 (millions of pesetas)



Source: Own elaboration. Data from the Records and General Accounts of the Monte de Piedad and the Caja de Ahorros de Madrid (years 1920-1934); Anuario Estadístico de España (years 1915-1919) and Ceballos Teresí (1929)

As Graph 2 reflects, as of 1920 loans were lower than remunerated deposits, showing that rural savings banks were carrying out credit operations of a non monetary nature through the purchase of farming materials. Rural savings banks made sales to their members in the form of credit operations to be paid off in low-interest monthly instalments, with the profits being used to bolster their reserve funds. Rural savings banks that were members of a federation participated in general purchases of fertilizers made by the body and were thus able to bring down the prices for their own associates. Moreover, the federations were in a position to attend fairs and competitions, where they would collect samples of fertilizing products which they would then analyse in their laboratories before buying those of the highest quality (Pejenaute, 1989, p.667). The federated rural savings banks therefore had access to these products and could offer them to their members with financing, at a lower price and of better quality than the

ones they could buy in the local storehouses. Some rural savings banks also bought machinery (harvesters, threshers, fumigators, etc.) which they then rented out to their members at a moderate price.

As of 1917 the credit cooperative scenario became more complicated. We find different types of organization and functioning and different types of activity being developed. In the first place, the local rural savings banks locales which functioned autonomously and were not federated had, in general, a very limited sphere of action and devoted their efforts exclusively microcredit operations aimed to ensure the survival of the small family businesses. They had difficulties in securing external funding while, besides their small numbers, there was also the negative effect of their being mainly made up by poor country folk. Sustainability was continuously under threat.

In the second place were the local, autonomously run rural savings banks which were associated to a provincial, regional or national federation. Such a position opened the doors to external financing from both private and public sources through the federation (which usually had a central rural savings bank). Moreover, they could deal with other federated cooperatives in balancing the accounts and have some supervision over their accounting, which could point managers in the right direction to make improvements. This situation made them more reliable and sustainable. This group comprised entities from the small, village-based ones to the powerful local rural savings banks of the farming towns of the Mediterranean coast and Andalusia.

The third situation corresponds to the credit sections known as the general cooperatives. The largest multiple cooperatives, (buying and selling, marketing, industrial production, wine cellars, etc.) usually had a credit section which as well as managing the savings of the members, made them loans and financed parts of their operations. These sections could benefit from external finance on their own merits. For example, the citric fruits traders of Valencia and Murcia used advances from the foreign trading houses they worked with or from the financing bodies of the federations to which they belonged.

In the fourth case were the (provincial, regional or national) federations that had their own central rural savings banks which acted as the financiers of the entity itself and of the affiliated ones. Their duties were varied: financing the federation; seeking out external funds for both the cooperatives and for the affiliated rural savings banks; overseeing and advising the rural savings banks and credit sections; redistribution of the capitals available in the rural savings banks, etc. The CNCA had a confederate savings bank which acted as the entity's bank and although the Catholic central office tried to convert it into a real private bank, all the attempts met with failure.

4.- STATE INTERVENTION: FOSTERING AND HINDERING

The widespread interest of public authorities towards cooperativism sprang from the crisis at the end of the nineteenth century. It was one more element in a line of policies aimed at encouraging farm production and technical change. For some European countries this was not

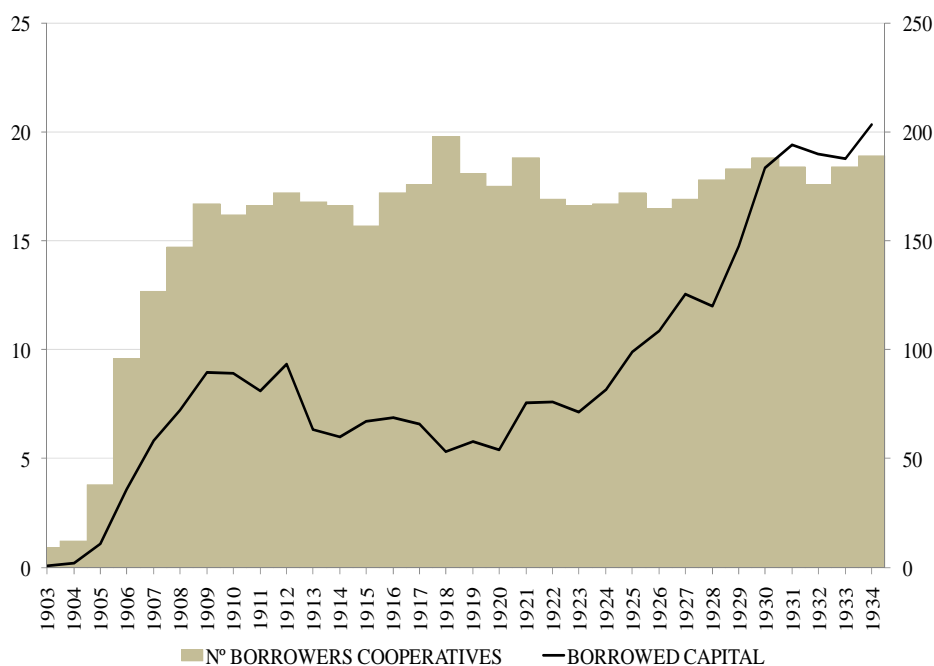
a key element in the driving force behind the cooperatives. In Denmark and Holland, for example, these were supported by a large number of farmers¹⁶. In the south of Europe, where the country workers were very important to the landowners, the role of the State took on much more importance in the development of these businesses. This was motivated by many reasons which had to do with interventionism in the improvement of productive conditions¹⁷: the strengthening of family exploitations, considered the most efficient way of keeping down production costs and organizing agricultural activity; the integration and control of agricultural associationism, which had arisen with the Great Depression thanks to legislation in cooperative matters; the introduction of arbitration for opposing agricultural interests (large owners, farmers and workers) as a means of avoiding social conflicts and in winning the vote of small farmers in the political elections.

In Spain, the reasons behind State actions were related more to issues of production and to the political setting of the rural population. The problems of rural financing were attributed to the zero interest and indifference of the commercial banks in the applications for credit made by small farmers and to the bad will (attempts to exploit) of informal moneylenders. Bankers did not wish to deal with these customers and moneylenders sought to exploit them. With such a scenario the State saw itself as obliged to correct the failings of the market. The response of the Administration took the form of searching out benevolent agents willing to provide such services to the customers without exploiting them. These agents were the Banco Hipotecario de Spain, el Banco de España, the public granaries, the Servicio Nacional del Crédito Agrícola and, in another line, agricultural cooperativism. Those agents who depended directly on official action proved disastrous, since the capitals they were granted were clearly insufficient and even out of line with objectives. Graph 3 informs on the credit activity of the Bank of Spain with the agrarian cooperatives. This information is relevant for two reasons. First, the Bank of Spain was the most relevant public agency that supplied capital at a low price to the cooperatives. Second, the econometric estimates in Section 5 confirm the relevance of the credit activity of the Bank of Spain for the spread of agrarian cooperatives in Spain in the first third of the 20th century. As showed in Graph 3, its credit operations with the agricultural cooperatives increased between 1923 and 1934. It was the result of political pressures and the increasing funding needs of agrarian agents to survive.

¹⁶ See Henriksen (1999) for Denmark and Knibbe (1993) for Holland.

¹⁷ Koning (1994) and Garrabou (1993).

Graph 3. Bank of Spain credit operations with the agricultural cooperatives 1903-1934 (borrowed capital in millions of pesetas and number of cooperatives assisted)



Source: Bank of Spain - Historical Archives, DGS, leg. 2001 and 2025.

The error of the official diagnosis was that it failed to take into account the difficulties involved in offering financial services to rural customers. It was not that the private banks did not want to lend in rural areas, even though there were possibilities for good business. Banks and bankers knew that the traditional banking methods in this activity were not profitable on account of the high costs and risks involved in providing financial services in rural spheres. The mistake in the State interventions was to consider that since it was a problem of willingness and not one of difficulty, all that was needed was legislative intervention and to open up lines of subsidized funds. State intervention during this period did not remove any of the more important obstacles and even the tax exemptions envisaged in the 1906 Act would not come into effect before 1915. Simple will was not enough to overcome the obstacles to the development of financial transactions in rural areas nor could it make the costs that arose from trying to overcome these difficulties disappear.

5.- AN ECONOMETRIC MODEL TO EXPLAIN THE SPREAD OF THE RURAL SAVINGS BANKS

5.1.- Sample specification and variables used

In order to analyse and unravel the variables that may have affected the spread and implantation of agricultural cooperativism, in particular that of credit, in Spain, we have carried out several econometric estimations, which we detail below. As time slots we chose the years 1910, 1915, 1918, 1923, 1927 and 1933, on account of the existence of quite acceptable official

statistics on agrarian cooperatives¹⁸, which allowed us to trace the numbers involved down to a local and individual level, through data such as the name of the entity, the location, the province, the number of members, the social capital, what business they were devoted to, deposited capital, loan capital, funds from the Bank of Spain and funds from private entities.

For our analysis we opted for the provincial level rather than the regional to reflect the spatial specificity that a regional analysis would not capture. This decision meant that in some of the provincial sub-samples there are no observable phenomena, i.e., in some years there are no agricultural cooperatives. This is important since 15% of the observations of the agricultural credit cooperatives are zero. This bias has been taken into account in the analysis as we have made a separate analysis of the factors that determine the presence of cooperatives, given the fact that this phenomenon does indeed exist in the territory.

Before proceeding, it is useful to define what an agrarian credit cooperative is and, in particular, to characterize the model that prevailed in Spain. Martínez Soto¹⁹ has defined the Spanish model of agrarian credit cooperatives as similar to the German Raiffeisen credit cooperatives but with some features of the models implemented in Italy and France.

Moreover, the Spanish model was heterogeneous in that there were some varieties of the Raiffeisen model like, for example, the “Rural Savings Banks, Aid and Loans” which did not offer financial services. Other entities followed the secular model developed by Rivas Moreno and were named “Rural Savings Banks and Loans”. These entities differed from the rest of agrarian credit cooperatives in some relevant aspects. First, they did not make use the unlimited solidarity. Second, they professionalized its management from the beginning. Finally, in some cases the benefits were distributed among the members of the cooperative according to their participation.

Despite its heterogeneity, the official statistics only provide information about agrarian credit cooperatives under the generic denomination “Rural Savings Banks” and, thus, we have to follow the same classification. Anyway, the official statistics that we use²⁰ provide us with precise information regarding the number of rural banks, its composition (number of farmers associated, amount of social capital) and credit activity (amount of capital lent to its members, subsidized loans received from the Bank of Spain and savings obtained from its members and from external sources).

Having a sufficient number of members, that is, of associated farmers, is a prerequisite for a cooperative to survive and to have a relevant and stable activity since the contributions of their members were their most important source of funding. We have paid particular attention to the variables that inform on the cooperatives’ financial situation since most of the cooperatives

¹⁸ On the reliability of these sources, see Garrido (1996) and Martínez Soto (2003). The statistics cited are from: Ministerio de Fomento (1910), Anuario Estadístico de España (1915) and (1927); Dirección General de Agricultura (1918) and (1934) and Lorenzo Muñoz-Dirección General de Agriculturas (1923).

¹⁹ Martínez Soto (2000), (2003_a) y (2003_b)

²⁰ Ministerio de Fomento (1911); Anuario Estadístico de España (1926) y (1927); Dirección General de Agricultura (1919) y (1934) y L. Muñoz (1923).

disappeared because of its limited economic capacity to act as a financial intermediary. For these reasons, we have used as explanatory variables in the econometric analysis the amount of capital obtained from its members and from external sources like the Bank of Spain or private banks and the amount of capital lent to its members.

The amount of social capital is another key aspect that has to be analyzed in order to understand the cooperatives' probability of gaining access to the financial markets and, thus, its likelihood of surviving. In the Spanish case, the agrarian credit cooperatives created by richer landowners, that is, those that were the owners of big and medium territories, accumulated a higher amount of social capital and they showed a higher sustainability and solvency than those created by poorer farmers.

The Bank of Spain gave loans to the credit cooperatives at a low interest rate but its credit activity with these institutions was quite limited. For example, the rural savings banks in the Spanish central-western province of Badajoz were the ones that received a higher amount of loans from the Bank of Spain and also the most capitalized agrarian credit cooperatives in Spain.

Finally, the last financial dimension that we consider is the rural savings banks' ability to obtain funding resources from private funding institutions like private banks, other cooperatives, federal central banks or commercial firms, among others. The most relevant aspect in this case is not the amount of capital obtained, since the cooperatives that were integrated in a federation could obtain loans on the basis of political or strategic criteria. Furthermore, the saving banks that oriented a part of their production to the international markets obtained in some cases the loans that they needed from the commercial brokers on account of the harvest and regardless of their social capital.

As an indicator of the level of development of a territory, we include the provincial share of active population in the agricultural sector and the provincial rate of illiteracy, taken from Vilanova Ricas and Moreno Juliá (2002). The rate of literacy is also used as a proxy for the distribution of human capital in the territory. There is wide consensus on the importance of human capital as a determining factor in the spread of cooperativism (Fernández, 2010; O'Rourke, 2007a, 2007b), as well as on the fact that a population that has a literary base, albeit minimum, is a key element for the feasibility and sustainability of the cooperative financial entities, since otherwise the members would not be able to participate in its running.

Since our goal is to analyze the determinants of the presence and spread of credit cooperatives, we give more weight to these institutions over other cultural or contextual elements like the presence of rural associations or other type of cooperatives in the province. In our view it is important to analyze the incidence of advertising elements, so we constructed a variable to take in this activity, through the presence of cooperative federations (all of these had their own advertising section), specific advertising centres and personalities who, in the history

of cooperativism, have played important roles in their advertising²¹. We use the number of federations instead of that of cooperatives champions since the former institutions are located in a particular territory and they had a relevant impact on the spread of cooperatives by means of advertising campaigns. Conversely, the leaders' activity is difficult to assign to a particular territory. For example, Rivas Moreno's activity affected several Mediterranean provinces and Andalusia. Díaz de Rábago - the first scholar who wrote on Raiffeisen System in Spain - influenced the first generation of confessional cooperatives in the beginning of the 20th century. Official statistics on federations offered also great consistency for years of this study.

The population variables – taken from the Population Censuses of Spain of (1900), (1910), (1920) and (1930) - are gender biased; since women were not members of the cooperatives, only the male active, farming population has been taken into account. We aggregated the population of the councils that integrate each province in order to obtain the active male population, the active agrarian population and the number of people that can read and write.

The number of "positos" (granaries) in each province and the capital that these institutions lent to the farmers living there are also include in the analyses. The "positos" were public microcredit institutions located in the rural areas. Its number was higher than that of rural savings banks in the time period that we analyze. These two institutions were not always competing when they coincided in the same town. Conversely, they were sometimes collaborating.

Finally, we also control for the number of saving banks in a province (?). The saving banks competed with the rural saving banks for the savings. There is no evidence that the cooperatives located their savings in the rural savings banks or in the savings banks. The inclusion of this variable in the analysis might shed some light on that point.

The monetary variables are measured in current pesetas. In Table 2a we provide a summarized description of the variables initially collected. In Table 2b we present the variables selected from those in the former table to be used as controls in the econometric analysis.

²¹ Data for this variable come from the statistics cited for the other variables (number of cooperatives, resource recruitment, etc.); Noguera (1913); Rivas Moreno (1902) (1909) and (1913); Redonet López-Dóriga (1924).

Table 2a.- Descriptive statistics of the sample.

| Variable | Observations | Mean | Standard Deviation | Min | Max |
|----------|--------------|-----------|--------------------|--------|----------|
| v1 | 294 | 9.391156 | 1.749325 | 0 | 156 |
| v2 | 294 | 1499.34 | 2.576272 | 0 | 17078 |
| v3 | 294 | 784434.1 | 2606714 | 0 | 3.43e+07 |
| v4 | 294 | 753561.6 | 3223276 | 0 | 4.68e+07 |
| v5 | 294 | 105906.6 | 589368.8 | 0 | 5385241 |
| v6 | 294 | 27893.22 | 84430.46 | 0 | 665517 |
| v7 | 294 | 3081115 | 2.13e+07 | 0 | 2.44e+08 |
| v8 | 294 | 71.214229 | 6.941.303 | 0 | 297 |
| v9 | 294 | 1.261905 | 1.467316 | 0 | 12 |
| v10 | 294 | 547249.8 | 718213.5 | 0 | 51414425 |
| v11 | 294 | 166353.1 | 97928.55 | 36302 | 720385.6 |
| v12 | 294 | 54360.71 | 38771.73 | 2435.5 | 186603 |
| v13 | 294 | 83419.02 | 41160.62 | 16233 | 230796 |
| v14 | 294 | 222263.8 | 125788.3 | 48471 | 949236 |
| v15 | 294 | .7891156 | .408632 | 0 | 1 |

Sources: Ministerio de Fomento (1911) for 1910; Anuario Estadístico de España (1915) for 1915; Dirección General de Agricultura (1918) for 1918; L. Muñiz (1923) for 1923; Anuario Estadístico de España (1927) for 1927 y Dirección General de Agricultura (1934) for 1933. Population data for: Population censuses Spain (1910, 1920, 1930 and 1940). For "literacy": Vilanova Ricas and Moreno Juliá (1992). For "Savings Banks": Martínez Soto and Cuevas Casaña (2001); For "Pósitos": Martínez Soto (2003).

Note: Endogenous variables v1 Number of Rural Savings Banks; v2 Number of members; v3 Loans to the members; v4 Members' deposits; v5 Loans from the Bank of Spain; v6 Loans from private financial institutions; v7 Social capital. Exogenous variables: v8 Number of Pósitos; v9. Number of Savings Banks; v10 Loans to the Pósitos; v11 Total masculine population; v12 Masculine literate population; v13 Masculine working population; v14 Masculine agrarian working population; v15 Propagandist (federations).

Table 2b.- Descriptive statistics of the sample

| | |
|--|------------|
| Cooperatives (presence) | 84,70 |
| Cooperatives (number) * | 11,09 |
| | (18.5) |
| Members (number)* | 1770,31 |
| | (2712.9) |
| Funds from members* | 889747,4 |
| | (3486121) |
| Funds from the Bank of Spain* | 125046,4 |
| | (638733.7) |
| Funds from other sources* | 32934,16 |
| | (90858.6) |
| Pósitos (presence) | 72,11 |
| Pósitos (number) ** | 98,76 |
| | (62.9) |
| Pósitos (loans) ** | 758921,9 |
| | (744910.5) |
| Savings banks (presence) | 72,11 |
| Masculine illiteracy rate (%) | 31,65 |
| | (16.2) |
| Rural active population (%) | 39,94 |
| | (12.5) |
| Propagandist (presence of federations) | 78,9 |
| Number of observations | 294 |
| Number of regions | 49 |
| Number of years | 6 |

Notes: The table reports proportions and means and standard deviations in parentheses for discrete and continuous variables, respectively. * and ** indicate that the statistic is conditioned on there being a positive number of cooperatives and pósitos, respectively.

5.2. The model

In this section we present and estimate econometric models of the presence and spread of cooperatives. We separately analyze the determinants of the presence of cooperatives in a province from those of the number of cooperatives therein, conditioned on there being cooperatives. This is a relevant distinction since the factors determining the presence of cooperatives are not necessarily those explaining its spread, as we find out in this paper. Moreover, finding no cooperatives in a particular region is not a rare event. That is the case at least one year in 16 out of the 49 Spanish provinces and the number of observations with zero cooperatives amounts to 15.3 percent of the estimation sample.

We model the number of cooperatives in province i and year t , denoted by y_{it} , using the following specification

$$y_{it} = \beta x_{it} + \eta_i + \varepsilon_{it} \quad (1)$$

where x_{it} is a set of explanatory variables, β is a vector of unknown coefficients to be estimated, η_i is a province specific unobserved effect and ε_{it} is a normally distributed error term. Model (1) is estimated using the subset of observations with a positive value of the dependent variable, that is, by restricting the analysis to provinces with cooperatives.

To identify the determinants of the presence of cooperatives in a province we use the following specification

$$y_{it}^* = F(\gamma z_{it} + \eta_i + u_{it}) \quad (2)$$

where y_{it}^* is a dummy indicator variable that equals one if y_{it} is positive and zero otherwise, z_{it} is a set of explanatory variables, γ is a vector of unknown coefficients to be estimated and F is the cumulative distribution function of $-u_{it}$. Model (2) is estimated using the whole sample.

Models (1) and (2) are estimated using panel data techniques that take account that we have repeated observations of each province, increasing the efficiency of the estimates relative to the conventional ordinary least squares or probit estimators, respectively. To deal with the potential endogeneity of some of the regressors we proceed in two ways. First, as a robustness check to the standard specifications in (1) and (2) we take the information for the explanatory variables from the time period preceding that for the dependent variable. This implies a lag of at least three years between the information of the dependent and the explanatory variables. Second, we estimate models (1) and (2) using two estimators which differ in the assumptions they make about the correlation of the covariates and the error term and that are likely to reach to different conclusions when endogeneity is a relevant issue.

The first estimator that we consider is the random effects estimator, that allows dependence between the covariates and the province specific unobserved effect and assumes that the covariates are strictly exogenous with respect to the random error term conditional on η_i . The random effects estimator is applied to model (1). For model (2), we use the random effects probit estimator that explicitly accounts for the dependent nature of the dependent variable.

The second estimator that we consider is the fixed effects regression estimator. Contrary to the random effects estimator, this estimator provides unbiased and consistent estimates no matter what is the form of the dependence between η_i and the covariates. The estimation sample is restricted to those provinces where the dependant variable changes during the sample period and it only identifies the effect of time-varying covariates. As previously argued, the random and fixed effects estimates differ to a great extent if endogeneity is a salient issue. Thus, the comparison of these two set of estimates provides evidence on the causal content of our conclusions.

As with the random effects estimator, the fixed effects estimator is also adapted to the discrete nature of the dependent variable in model (2). The fixed effects estimator that we use to estimate model (2) is the conditional fixed effects logit model. Wooldridge (2002) describes the properties of the random and fixed effects methods and Chamberlain (1980) do so with the properties of the random effects probit and the conditional fixed effects logit estimators.

We also analyze the cooperatives' credit activity by estimating model (1) using the amount of capital lent to the farmers as the dependent variable.

5.3. Estimation results

Tables 3, 4 and 5 present the estimates for the determinants of the number of cooperatives, its presence and its credit activity, respectively. The specifications reported are those that provide the highest goodness of fit, that is, those that allow us to explain the highest percentage of variability of the dependent variable. The specifications control for the amount of capital available to the cooperatives and distinguishes whether it comes from its own members, from the Bank of Spain or from other private sources. We further control for the number of *pósitos*, it is graneries, and savings banks in the region, as they are likely to compete with the cooperatives, and for whether there are propagandists that advertise the cooperative's credit activity or not. The number of *pósitos* is replaced by a measure of its credit activity when analyzing the cooperatives' credit activity for goodness of fit reasons. Year and regional dummies, the masculine illiteracy rate and the share of the total active population in the rural sector are included to control for aggregate effects.

Table 3. Determinants of the number of cooperatives. Panel estimates.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|-------------------------------|---------------|---------------|-----------|------------|-----------|---------------|
| Members (funds) | 0.0004* | 0.0004* | 0.0015*** | 0,0008 | 0,0004 | 0,0001 |
| | (0.0002) | (0.0003) | (0.0003) | (0.0010) | (0.0003) | (0.0015) |
| Bank of Spain (funds) | 0,0023 | 0,0021 | 0,0028 | 0.0040** | 0,0013 | 0,0004 |
| | (0.0015) | (0.0016) | (0.0085) | (0.0018) | (0.0030) | (0.0033) |
| Other (funds) | 0.0303** * | 0.0297** * | 0,0081 | -0,0274 | 0.0265*** | 0.0394** * |
| | (0.0077) | (0.0084) | (0.0061) | (0.0198) | (0.0096) | (0.0102) |
| Pósitos (number) | 0.0266* | 0.0271* | 0.0277** | 0,0049 | -0,0427 | 0,0047 |
| | (0.0150) | (0.0153) | (0.0129) | (0.0170) | (0.1966) | (0.2615) |
| Savings banks (number) | 0,0406 | -0,2010 | -0,5075 | -2.2074*** | 0,2052 | - 2.0820** |
| | (0.5422) | (0.6264) | (0.4188) | (0.8281) | (0.7942) | (1.0932) |
| Masculine illiteracy rate (%) | 0,0665 | 0,1146 | 0,0732 | 0,0542 | 0,0942 | -0,0721 |
| | (0.0954) | (0.1045) | (0.0772) | (0.1141) | (0.1123) | (0.1487) |
| Rural active population (%) | -0,0362 | -0,0609 | -0,1190 | -0,0644 | -0,2224 | -0,2812 |
| | (0.0650) | (0.0890) | (0.0850) | (0.1142) | (0.1617) | (0.1847) |
| Propagandist dummy | 2,0763 | 2,2320 | 1,9105 | 1,8814 | 0,2082 | 1,4458 |
| | (1.8935) | (2.4783) | (1.5126) | (2.5740) | (2.6815) | (2.9177) |
| Constant | -0,7829 | 2,5436 | 9,9420 | 14,7023 | 18,6877 | 27,4381 |
| | (7.6415) | (9.4128) | (7.0479) | (10.5647) | (17.5150) | (23.1450) |
| Number of observations | 294 | 249 | 226 | 198 | 249 | 198 |
| R-sq: within | 0,085 | 0,087 | 0,172 | 0,202 | 0,072 | 0,164 |

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, ** and * indicate statistical significance at 1, 5 and 10 percent levels, respectively. Columns (1) to (4) report random effects estimates while columns (5) and (6) report fixed effects estimates. Random effects estimates include region and year dummies. Fixed effects estimates include year dummies

Table 3 presents six sets of estimates of the determinants of the spread of cooperatives. It is organized as follows. In columns (1) to (4) we present different random effects estimates where we vary the specification and the estimation sample to explore the robustness of the estimates. In columns (5) and (6) we present the fixed effects estimates obtained using the same specification and estimation sample than in columns (2) and (4), respectively, to gain some insight on the relevance of endogeneity issues.

The estimates in the first column of Table 2 are obtained using the whole sample and they are included for comparison purposes. The remaining estimates in Table 2 are obtained using the subsample with positive values of the dependent variable. The comparison of columns (1) and (2) indicates that we reach to the same conclusion no matter whether we use the total or the conditional sample. We find that the higher the number of *pósitos* in a province the higher the number of cooperatives in that region. We interpret this result as evidence that both *pósitos* and cooperatives are likely to be located in the same regions, i.e., those where the credit activity is more profitable. We also find a positive and statistically significant association between the

number of cooperatives and the amount of capital they obtain from their own members and from private sources, with the effect of the latter funding source being much larger than that of the former one. According to the estimates in column (2), there is one additional cooperative for every 33 thousand pesetas coming from exogenous private sources. This effect is almost 75 times larger than that estimated for the capital obtained from their own members.

The estimates in column (3) are obtained using the conditioned sample and excluding those regions where the number of cooperatives is particularly high, i.e., above percentile 95th of the national distribution of the number of cooperatives. This estimation exercise allows us to test for whether the estimates in column (2) are conditioned by extreme values in the dependent variable. Estimates in column (3) confirm preceding major findings. The comparison of columns (2) and (3) suggests that the capital obtained from exogenous sources, that is, the Bank of Spain and other private sources, is only a relevant source of funding for cooperatives located in regions with a particularly high number of cooperatives. This, in turn, suggests that cooperatives located in these provinces have access to more sophisticated capital markets and funding channels than those located in other areas. As an illustrative example, the capital obtained from the Bank of Spain by cooperatives in the four regions with more cooperatives is, on average, 35 times higher than that obtained by cooperatives in the remaining regions. The ratio is close to 2 when dealing with capital coming from other private sources.

To properly distinguish between the causes and the consequences of the number of cooperatives, the information for the explanatory variables is obtained from the year preceding that for the dependent variable in column (4). Interestingly, we find that the higher the number of potential competitors, that is, *pósitos* and savings banks, the lower the number of cooperatives in the next year. That is, cooperatives are likely to be located in the same provinces than their potential competitors, as suggested by estimates in preceding columns, but the higher the number of competitors today, the lower the number of cooperatives tomorrow. According to these estimates, the number of cooperatives in a province lowers by 2.2 cooperatives if the number of savings banks in the precedent year increase by one unit.

The last two columns of Table 2 present the fixed effects regression version of the estimates in columns (2) and (4). The coincidence of these results with those obtained using the random effects estimator indicates that our conclusions are not conditioned by endogeneity issues. We find a positive association between the amount of capital that the cooperatives obtain from private exogenous sources and the number of cooperatives no matter whether the information for the covariate is referred to the year of that for the dependent variable or to the precedent one. As before, we find a negative correlation between the number of savings banks today and the number of cooperatives tomorrow.

Table 4. Determinants of the presence of cooperatives. Panel estimates

| | Random Effects | Fixed Effects |
|-------------------------------|----------------|---------------|
| | Probit (1) | Logit |
| Pósitos (number) | 0,018 | 0,033 |
| | (0.012) | (0.147) |
| Savings banks (number) | 0,395 | 0,353 |
| | (0.268) | (0.475) |
| Masculine illiteracy rate (%) | -0.074* | -0.096** |
| | (0.039) | (0.045) |
| Rural active population (%) | -0,003 | -0,024 |
| | (0.017) | (0.033) |
| Propagandist dummy | 0,270 | -1,359 |
| | (0.546) | (0.853) |
| Number of observations | 294 | 90 |
| Log likelihood | -64,98 | -29,03 |

Notes: Heteroskedasticity-robust standard errors in parentheses. ** and * indicate statistical significance at 5 and 10 percent levels, respectively. (1) We report marginal effects from probit random effects estimates.

In Table 4 we examine the determinants of the presence of cooperatives. Both random and fixed effects estimates attest that the lower the masculine illiteracy rate, the more likely it is that there are cooperatives in a particular region and year. The estimated marginal effects from the random effects estimates means that the probability of there being cooperatives in a region lowers by the considerable amount of 0.7 if the average masculine illiteracy rate increase by ten percentage points.

The latter result justifies the need of separately analyzing the presence and number of cooperatives. As shown in columns (1), when no distinction is made between those two dimensions we reach to the wrong conclusion that the masculine illiteracy rate is not a relevant variable when analyzing the spread of cooperatives in Spain. This also holds when analyzing the cooperatives' credit activity in Table 4.

Table 5.- Determinants of cooperatives' credit activity. Panel

| | (1) | (2) | (3) | (4) | (5) | (6) |
|-------------------------------|-----------------------------|-----------------------------|---------------------------|-----------------------------|----------------------------|----------------------------|
| Members (number) | 125.58*** (24.34) | 122.09*** (27.02) | 144.40*** (23.02) | 70,87 (123.07) | 114.59*** (30.12) | -118,90 (148.90) |
| Members (funds) | 0.57*** (0.02) | 0.57*** (0.02) | 0.47*** (0.03) | 1.80*** (0.16) | 0.58*** (0.02) | 2.82*** (0.24) |
| Bank of Spain (funds) | 1.15*** (0.09) | 1.13*** (0.10) | -0,30 (0.43) | 0.87*** (0.28) | 0.72*** (0.20) | 2.95*** (0.50) |
| Other (funds) | 1.26*** (0.49) | 1.27** (0.54) | 0,22 (0.32) | -1,76 (1.42) | 1.86*** (0.64) | 2.60* (1.59) |
| Pósitos (loans) | -0,06 (0.07) | -0,06 (0.10) | -0,06 (0.05) | -0,42 (0.48) | 0,12 (0.11) | 0,10 (0.75) |
| Savings banks (number) | -109325.90*** (34056.00) | -116060.50*** (40018.82) | -27951,34 (21752.78) | -149061.60 (124177.80) | -112681.00** (52272.10) | 656517.40 (517258.70) |
| Masculine illiteracy rate (%) | 2949,97 (5162.52) | 3549,25 (6152.45) | 1139,21 (2979.30) | -1541,21 (15575.57) | -18361,30 (7578.74) | -89070.89*** (22595.27) |
| Rural active population (%) | 410,09 (3973.65) | 1296,85 (5691.18) | 4534,86 (2910.53) | 41241.99** (17111.19) | 6686,73 (7725.15) | 29799,82 (28513.11) |
| Propagandist dummy | -22146,31 (117688.30) | -55841,83 (156793.90) | -42971,31 (77352.27) | -220281,70 (376386.80) | -56948,61 (182562.40) | -321893,60 (443648.50) |
| Constant | -14077,19 (396666.90) | 85806,45 (505187.60) | -243490,30 (177881.60) | -2535630,00 (1324573.00) | 464646,00 (468848.50) | 1077214,00 (1393602.00) |
| Number of observations | 294 | 249 | 226 | 198 | 249 | 198 |
| R-sq: within | 0,905 | 0,908 | 0,929 | 0,650 | 0,903 | 0,649 |

Notes: Heteroskedasticity-robust standard errors in parentheses. ***, ** and * indicate statistical significance at 1, 5 and 10 percent levels, respectively. Columns (1) to (4) report random effects estimates while columns (5) and (6) report fixed effects estimates. Random effects estimates include region and year dummies. Fixed effects estimates include year dummies.

Estimation results in Table 5 are in line with those obtained in Table 3 when analyzing the number of cooperatives. The estimates are presented in the same order as those in Table 2. That is, in the first four columns we present random effects estimates obtained using different specifications and estimation samples as a robustness check. In the last two columns we analyze the relevance of endogeneity issues by presenting fixed effects estimates obtained using the same specification and estimation sample that some of the preceding random effects estimates. We now include as an additional covariate the number of members of the cooperative. First, we find that the cooperatives' credit activity is higher the higher are the number of members and the amount of capital available to them, no matter where does that capital comes from. However, the effect on the cooperatives' credit activity is largest when the capital comes from exogenous private sources. As before, we obtain evidence that cooperatives located in regions with a particularly large number of cooperatives have access to more sophisticated capital markets than those located in other provinces. This result emerges when comparing columns (2) and (3).

We also find that competition between cooperatives and other credit institutions, particularly so savings banks, dampens the cooperatives' credit activity. The higher the number of savings banks in a region the lower the amount of capital that cooperatives lend to farmers living in that region. Regarding *pósitos*, its credit activity is negatively related to that of the cooperatives, but the effect is not significant at standard significance levels.

The percentage of active population in the rural sector is positively correlated to the cooperatives' credit activity, although this effect is only statistically significant in column (4), when the information for the covariate is lagged with respect to that for the dependent variable.

Finally, fixed effects estimates in column (6) indicate that the masculine illiteracy rate negatively affects the amount of capital that cooperatives lend in that region.

6. CONCLUSIONS

In the last decade of the nineteenth century and the early years of the twentieth the rural savings banks (agricultural credit cooperatives) were limited in their appearance in Spain to just a few farming areas. These early entities had an experimental and token meaning, with their financial reach and their capacity to achieve large numbers being very restricted. As with the other cooperatives, it was the Agricultural Syndicates Act of 1906 and its ruling in 1908 that spelled the first wave of establishments. Consolidation was achieved around 1915-1917, when the State finally conceded the tax exemptions envisaged by the Act in the operations of the rural savings banks. The outcome was the establishment of around five hundred entities, a figure that would remain stable throughout the period studied.

The historical and explicative part of the development provides the main findings from the econometric estimations. Briefly, the spread of the savings banks was affected basically by three factors: the educational level of the human capital; the presence of competitor credit entities and the availability of internal and external resources.

As was to be expected, the level of education of the human capital in a particular area, which grants access to written media, is a determining factor in the proliferation of formal credit. A literate population will be more inclined to sign documents and to understand the accounting mechanics of cooperative credit than one which requires third party assistance to process such information. Furthermore, the running of a cooperative, based on internal democracy, implies active participation on the part of its members in carrying out the tasks involved, including managerial ones. Higher levels of education were a factor behind a lot of these entities being concentrated in Navarre, some of the Castile-Leon provinces (Burgos, Soria, Leon, etc.), Valencia and Catalan provinces. Thus, the level of education of the members is to large extent decisive for the possibilities of setting up and, more importantly, sustaining cooperatives.

The econometric approach gives some very detailed results which would be less forthcoming through mere observation. In the first place, we find that the percentage of illiterate males is the main determining factor behind the presence of cooperatives in a specific territory, and the correlation between the two variables is negative. Elsewhere, the number of cooperatives, conditioned by the fact that there are cooperatives, correlates positively with the

number of savings banks and public granaries, i.e. potential competitors, and with access to outside sources of finance like the Bank of Spain or the various private funds of the members.

Given the scarce financial capacity of the typical savings bank customer, the survival of these was determined more by access to private resources than to their own volume of capital. In regions where there was a high density of cooperatives, having access to outside funds, in particular credits from the Bank of Spain, was an important element in ensuring continuation and success in the tome of the cooperatives. Access to external funds, from the Bank of Spain in the main, led to strong implantation in Badajoz, Navarre, Tarragona and Santander

The robustness analyses performed suggest that the correlations highlighted here have their causal contents since the results hold on bringing forward the time period of the dependent variable while maintaining that of the explanatory and using the fixed effects estimators. Finally, we obtain a negative correlation between the number of savings banks and public granaries in a particular year and the number of cooperatives in the same province the following year available. This result, in combination with the positive correlation mentioned above between the number of cooperatives and potential competitors in the same year, suggests that the credit entities were located in areas where there was a greater demand for their products and that the level of competition with other entities negatively affects the likelihood of the cooperatives surviving.

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