

## **Do Commercial Banks, Savings Banks, and Credit Unions Compete?**

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### **Abstract**

This paper attempts to evaluate the extent to which rivalry between the different financial intermediaries that operate in the Spanish banking system has been influenced by the recent liberalization process. Our theoretical model is borrowed from population ecology and allows us to take into account the relationship between the three types of financial intermediaries as well as the effect of other exogenous factors on the capacity of the environment to sustain the growth of each population.

*Key words:* banking sector; competition; deregulation; population ecology; Spain

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### **1. Introduction**

Do the different types of financial intermediaries operating in a banking industry compete? Is there a clear overlap between the market segments where each type of firm operates? Has the recent wave of deregulation increased rivalry between the different groups that constitute the banking system? These undoubtedly interesting questions have received relatively little attention in the literature; we consider them in this article.

Traditionally, banking activities have been highly regulated. For many years, banking firms have had strong limitations in what refers to the choice of competitive variables such as interest rates on loans and deposits or location decisions. In this

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context, it was argued that competition was usually scarce, with a clear segmentation of activities and most banks enjoying certain monopoly power within their market (product or geographical) niches. Once most of the restrictions have disappeared, financial intermediaries have redesigned their strategies in order to face the new competitive environment with the subsequent effect on rivalry. Recent literature has, in fact, documented this increase in competition; see, for example, the analyses of Gual and Neven (1992) in Europe, Jayaratne and Strahan (1997) or Strahan (2003) in the US, or Sturm and Williams (2004) in Australia. However, a great deal of research has focused the analysis of competition in only one group of intermediaries (usually commercial banks) forgetting that in many countries banking activities are developed by a variety of financial intermediaries (such as banks, savings and loans, savings banks, credit unions, co-operative banks, and building societies among others) whose activities have presumably shown a degree of confluence as a result of deregulation. Importantly, competition in the banking industry takes place among a set of entities with different objectives. This makes the analysis of the potential interactions arising among the different types of intermediaries especially interesting given that for-profit firms compete with mutual or not-for-profit firms (Emmons and Schmid, 2000).

This is precisely the main question we try to answer in this paper. Given that deregulation has finished in most of the developed countries, we are interested in knowing both (1) whether the different types of intermediaries were competing before deregulation and (2) how the new framework has affected competition between the different banking groups that operate in a given country. With this purpose in mind, our empirical analysis is conducted for the Spanish banking system, a context especially suitable for this type of research given the presence of three types of financial institutions (i.e., commercial banks, savings banks, and credit unions) which, in principle, had very different competitive profiles a couple of decades ago and whose activities have progressively converged.

Our research evaluates to what extent the different types of financial intermediaries take into account not only the decisions of the members of their same group but also competition coming from the rest of financial intermediaries at the time of designing their competitive strategies. With this aim, this paper applies a sociology-based model to evaluate the impact of deregulation in the industry as a whole, in vein similar to Barron et al. (1998). To analyze this phenomenon, we do not consider individual competitors; instead, we group the firms into competing populations as is common in population ecology.

## **2. Theoretical Framework**

One important area of study in population ecology is the analysis of the nature of growth. The main assumption in this literature is that the environment has a limited capacity of resources available to the development of an organizational form (e.g., a firm), which limits growth. When several organizational forms compete for the same bundle of resources, the interactions taking place give rise to a competitive

process whose final result is the selection of the fittest firms, while the rest exit the market. Although there are alternative ways to model growth and the competitive interactions among organizational forms (for example, Lotka-Volterra models) the use of partial adjustment models is frequent. The specific model we use in this research is largely based on Barron et al. (1998). It assumes that, for every infinitesimal period and each population, the social process under study (size of the population in our case),  $y_i(t)$ , evolves toward an objective value,  $y_i^*(t)$ , in accordance with the following expression:

$$\frac{dy_i(t)}{dt} = r[y_i^*(t) - y_i(t)], \quad (1)$$

where  $y_i(t)$  is the size of population  $i$  at time  $t$ ,  $y_i^*(t)$  is the environment capacity where population  $i$  develops, and  $r$  is the adjustment coefficient that determines the speed with which the system reduces the difference between  $y_i^*(t)$  and  $y_i(t)$ . According to expression (1), an increase in the value of  $y$  is proportional to the difference between the present value of the variable and its target value. The speed with which that difference is reduced depends on the adjustment coefficient  $r$ . When  $r$  approaches zero, the system converges slowly. On the other hand, the larger the value of  $r$ , the quicker is the reduction.

One interesting aspect of this type of model is that it represents competition between several populations using a system of interdependent equations. The most frequent strategy assumes that both the interaction among competing populations and the effect of exogenous factors affect equation (1) through their influence on the environment capacity to maintain every population,  $y_i^*(t)$ , in a linear form. That is:

$$y_i^*(t) = \sum_{j \neq i} \alpha_{ij} y_j(t) + \pi_i' x(t), \quad (2)$$

where  $\pi_i' x(t)$  represents the effect of exogenous variables  $x(t)$  and the  $\alpha_{ij}$  are competition coefficients. As we can see in equation (2), the environment capacity for each population depends on exogenous factors and on the interaction between the different populations. In this way, the estimation of the coefficients  $\alpha_{ij}$  allows us to obtain a measure of the intensity and direction of the interactions. When  $\alpha_{ij}$  and  $\alpha_{ji}$  are negative, the populations compete for the available resources. Conversely, if both coefficients are positive, the relationship is symbiotic and an increase in  $y_i(t)$  in one population has a positive effect on the other.

If we substitute expression (2) into (1) and simplify we obtain, for each population  $i$ :

$$\frac{dy_i(t)}{dt} = r_i y \sum_{j \neq i} \alpha_{ij} y_j(t) + r_i \pi_i' x(t) - r_i y_i(t). \quad (3)$$

In spite of its simplicity, the model cannot be estimated in a direct way, given the impossibility of observing infinitesimal increases considered on the left hand

side. An alternative way to proceed is to consider the integral of equation (3). To do this, we need to write the partial adjustment model in matrix form. Thus, equations (2) and (3) can be rewritten (Tuma and Hannan, 1984) as:

$$\frac{dy(t)}{dt} = R[y^*(t) - y(t)] \quad (4)$$

$$y^*(t) = Ay(t) + \pi x(t), \quad (5)$$

where  $R$  is a diagonal matrix that contains the adjustment coefficients for each of the  $J$  populations,  $dy(t)/dt$ ,  $y_i^*(t)$ , and  $y_i(t)$  are  $J \times 1$  vectors,  $A$  is a  $J \times J$  matrix with zeros along the main diagonal,  $x(t)$  is an  $(M+1) \times 1$  vector of explanatory variables, and  $\pi$  is a  $J \times (M+1)$  matrix that contains the coefficients that show the effect of the variations of the explanatory variables that correspond to environment capacity.

Substituting (5) into (4) and simplifying, we have:

$$\frac{dy(t)}{dt} = Cy(t) + Bx(t), \quad (6)$$

where  $C \equiv RA - R$  is a  $J \times J$  matrix and  $B \equiv R\pi$  is a  $J \times (M+1)$  matrix.

If we integrate equation (6) we obtain:

$$y(t) = \Gamma y(t_0) + \Theta_1 x(t_0) + \Theta_2 \Delta x(t), \quad (7)$$

where

$$\Gamma \equiv Ve^{\Lambda t} V^{-1} \quad (8)$$

$$\Theta_1 \equiv C^{-1}(\Gamma - I)^{-1} C \quad (9)$$

$$\Theta_2 \equiv C^{-1} \left[ \frac{1}{\Delta t} C^{-1}(\Gamma - I) - I \right] B \quad (10)$$

$$C \equiv V \Lambda V^{-1}. \quad (11)$$

So, to estimate the coefficients that appear in equation (3) we need to follow a two-stage procedure. First, we need to estimate the integral equation (7) to obtain matrixes  $\Gamma$ ,  $\Theta_1$ , and  $\Theta_2$ . Second, we use equations (9) to (11) to obtain the parameters of interest.

### 3. Organizational Forms in the Spanish Banking Sector

As stressed in Section 1, the main purpose of this paper is to assess whether the transformations taking place in the Spanish banking sector in recent years have influenced the degree of rivalry among the different types of populations. Therefore, a first key conceptual question that arises before applying the model proposed in Section 2 is the identification of the organizational forms operating in it. According

to Hannan and Freeman (1977), a population may be defined as a set of organizations that survive within the limits of a system and that share a common form. Although the literature does not provide us with a list of attributes in order to differentiate among the different organizational forms operating in a market, previous research (Barron et al., 1994, 1998) uses factors such as organizational origin, governance system, or a firm's objective function that may be applied to define populations in our context.

The Spanish banking sector is comprised of three types of financial intermediaries: commercial banks, savings banks, and credit unions. In spite of the fact that, currently, the three groups are able to perform the same type of activities throughout the country, this has not traditionally been the case. Importantly, the differences between them not only have been conditioned by factors such as origin, governance system, or objective functions, but also by regulation, which has determined both the scope of operation and the types of products and services offered.

For example, commercial banks have been traditionally specialized in wholesale banking, while savings banks and credit unions have centered their activities on retail banking. To understand these differences, we must take into account not only the regulatory environment faced by the banks, but also their different foundational nature and objectives, given that these circumstances have highly conditioned their positioning. Banks were created as for-profit limited firms, with the aim of performing the whole range of activities related to the provision of financial services. Savings banks, however, started to emerge in the middle of the 19th century, and their activity was initially oriented towards families and small businesses. Something similar occurred in the case of credit unions, which were founded under a clear mutual character. As a consequence, the product and geographic scope of savings banks and credit unions had been much more limited given that they were traditionally worried about the communities they tried to satisfy. However, this apparent constraint could have become, with the passage of time, a competitive strength given that those banking groups concentrated their activity in their home markets, which could have given them a high reputation among the customers they satisfied.

It is frequently argued that, until the early 1980s, savings banks and credit unions benefited from some market power. Nevertheless, after deregulation took place and some firms were involved in the subsequent branching expansion, this privileged position has been eroded, forcing the firms to redesign their strategies. The clearest implication of this regulatory change has been a new competitive landscape and a completely different market structure.

The consequences of the expansion of activities in both the geographic and product dimensions taking place after deregulation could also be interpreted from a sociological perspective. Population ecology assumes that, in order for competition between populations to exist, some overlap between the market niches occupied by those populations is needed. In this context, a market niche is defined by a bundle of resources that conditions firm's growth and survival (Hannan and Freeman, 1977).

Given the specific situation in the Spanish banking sector, the overlap between the niches of the three populations (and thus, their growth) has been affected by the evolution of regulation. A plausible interpretation is that while it was in place, every population had its market segment clearly defined and the degree of overlap was limited. Thus, each population chose their strategies independently and the interaction between groups was scarce. Therefore, the main implication of deregulation could have been to increase the set of available market segments and thereby increase market overlap.

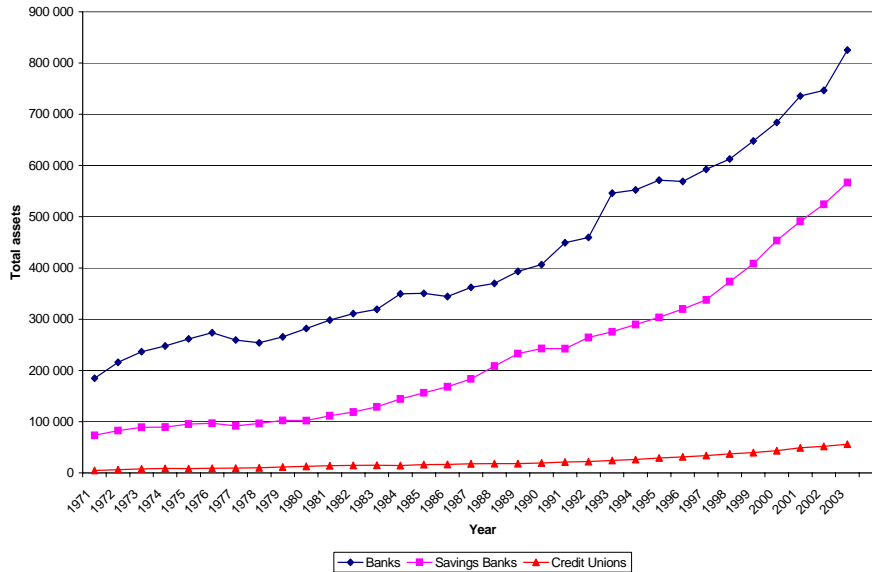
#### **4. Sample, Methodology, and Results**

As mentioned above, the objective of this paper is to analyze the competitive interaction among the three groups of financial intermediaries that competed in Spain from January 1, 1971, to December 31, 2003. For empirical purposes we consider the total assets of each population as our dependent variable (Barron et al., 1998) in order to take into account all the various activities performed by the banks. We use public information provided by the Bank of Spain, which shows the quarterly evolution of assets for the three populations. Consequently, we have 130 observations. The availability of a sufficiently long time horizon is crucial in this type of study since the consequences of the competitive process can only be observed in the long term. Additionally, by going back as far as 1971, we can study the deregulation process from the beginning. As a result, we minimize the possible bias due to omission of important independent variables.

Figure 1 presents the evolution of the total assets of the three groups for the period 1971 to 2003 (in constant 2003 prices). Although the trend is clearly increasing for the three groups, there are important changes with reference to their relative market share. For example, banks constitute the main group when we measure size by total assets, with a market share above 50%. However, its importance has decreased since the early 1980s, when the savings banks start to sharply increase their share, gaining more than 10 points in only a few years. Finally, credit unions have maintained a relatively stable participation, always below 4%, although their relative growth is greater than either competitor (their market share in terms of deposits or bank branches is higher; currently they have above 10% of the network and receive 7% of total deposits).

To better understand the evolution of banking assets, it is important to take into account some of the previously mentioned banking laws. Regulation has been especially important in driving population behavior, with the consequences for efficiency. It is evident that the present strategy is clearly conditioned by historical conditions, and the starting point (and starting resources and capabilities) is one of the main factors that determine future behavior. The resource-based view of the firm (Barney, 1991; Peteraf, 1993), for example, establishes that to achieve sustainable competitive advantages, firms need to use resources that are non-imitable (Barney, 1991), and history is clearly difficult to imitate.

**Figure 1. Evolution of Total Assets of Banks, Savings Banks, and Credit Unions, 1971-2003**  
(Thousand Euros, Constant 2003 Prices)



We estimate equation (7) with seemingly unrelated regression (SURE). The main advantage of this technique is that, in contrast to traditional regression methods, it is possible to consider the existence of correlation between the different equations and the interdependencies arising among them. Thus, this method provides us with coefficients that are consistent and more efficient than the ones resulting from separate estimation of each equation.

Table 1 shows SURE estimates of the integral version of the partial adjustment model proposed in Section 2. Global fit, measured by the R-squared statistic, exceeds 0.99 in all the three models. Importantly, the results of the Breusch-Pagan test for independence indicate that the absence of correlation among the three equations is rejected, and therefore the coefficients presented in Table 1 are consistent and more efficient than those resulting from separate estimation of each equation. The model not only includes interactions among the three populations considered but also takes into account the influence of GDP on carrying capacity,  $y_i^*(t)$ , and explores the possibility of a structural change in the interaction coefficients. Given that the liberalization took place progressively along several years, it is difficult to establish the exact moment where this structural change took place. However, there are several reasons to accept that it occurred around 1989. Beginning then, savings banks were allowed to open branches nationwide and many made wide use of this possibility (Fuentelsaz and Gómez, 2001). As a consequence, the savings bank branch network increased from 14,994 in 1989 to 20,871 at the end of 2003. In the same period, commercial banks reduced their network from 16,677

to 14,074 branches, while the number of branches for the credit unions grew from 2,890 to 4,460. This was also the year in which the Bank of Spain established a calendar to definitely eliminate the investment coefficient. Apart from this, in 1987 all interest rates and commissions became completely free. These measures completed the deregulation process with reference to banking activities and branching restrictions. The results of F-tests for the possibility that the structural change took place in 1985, 1989, and 1993 support this conclusion.

**Table 1. Interaction between Populations within the Spanish Banking Sector, 1971-2003;  
Integral Equation Estimates**

	Banks	Savings Banks	Credit Unions
Constant	7.445*** (6.39)	5.143*** (5.24)	3.074** (2.31)
Banks	0.647*** (8.45)	-0.238*** (-3.69)	-0.210** (-2.41)
Savings Banks	0.147*** (4.51)	1.137*** (41.17)	0.101*** (2.72)
Credit Unions	0.157*** (4.67)	0.111*** (3.94)	1.011*** (26.38)
GDP Growth	-0.322*** (-4.92)	-0.266*** (-4.82)	-0.056 (-0.76)
1989 Dummy	-2.129* (-1.76)	0.282 (0.28)	-3.717*** (-2.69)
Banks × 1989 Dummy	0.144 (1.38)	0.036 (0.42)	0.292** (2.45)
Savings Banks × 1989 Dummy	-0.044 (-0.56)	-0.210*** (-3.11)	-0.024 (-0.27)
Credit Unions × 1989 Dummy	0.011 (0.12)	0.182** (2.35)	-0.094 (-0.90)
$R^2$	0.996	0.999	0.998

Notes: \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10% levels; t-ratios are shown in parentheses.

As mentioned in Section 2, the estimations presented in Table 1 are not valid for our purposes and have to be transformed into competition coefficients in order to draw conclusions in terms of rivalry. Therefore, given our interest in examining whether competition between the three groups of intermediaries has been affected by deregulation, we focus attention on the differential equivalents to the interaction coefficients presented in Table 1.

Table 2 shows the interactions among intermediaries in the Spanish banking sector resulting from the conversion of interaction coefficients in Table 1 to competition coefficients (Tuma and Hannan, 1984). Panel A presents the results for the period before deregulation, highlighting the interactions that were significant in the SURE estimation. Although we focus attention on competition coefficients whose integral equivalent was significant, the literature is not clear on whether this



should be the case. Similarly, Panel B centers on the post-deregulation period in order to show the competition coefficients with changed values (the hypothesis that all interaction coefficients were the same for both the regulated and deregulated periods was rejected).

Our original interest in this article was to test whether deregulation has modified the competitive conditions among groups of intermediaries operating in the Spanish banking sector. The comparison of Panels A and B provides us with a first answer. Since only two competition coefficients are significant in Panel B, deregulation seems not to have significantly changed competition among groups. In fact, all coefficients in Panel A are negative, what leads us to conclude that the three groups of intermediaries were competing in the regulated period. After deregulation this situation only changed for two relationships: (1) savings banks began to experience a positive influence from credit union growth and (2) the growth in bank assets increased the carrying capacity for credit unions.

**Table 2. Interaction between Populations within the Spanish Banking Sector, 1971-2003; Differential Equation Estimates**

**Panel A: Regulated Period (1971-1988)**

	Banks	Savings Banks	Credit Unions
Banks		-0.661*	-0.619*
Savings Banks	-1.114*		-0.786*
Credit Unions	-7.325*	-5.071*	

Note: \* denotes significance in SURE estimation.

**Panel B: Deregulated Period (1989-2003)**

	Banks	Savings Banks	Credit Unions
Banks		-1.103	0.468*
Savings Banks	1.482		1.031
Credit Unions	1.636	3.139*	

Note: \* denotes significance in SURE estimation.

A close analysis of the patterns of competition reveals some differences in the intensity of the interactions. For example, the pressure exerted by savings banks on banks is nearly double the one of banks on savings banks (note that the assets of banks, savings banks, and credit unions are significantly different in magnitude, which conditions the interpretation of competition coefficients). Interestingly, the non-significance of the corresponding competition coefficients in Panel B means that this relationship has been maintained throughout the period 1971 to 2003. Apart from the relationship between the two larger groups of intermediaries (banks and savings banks), an interesting question that arises is whether credit unions compete with the other intermediaries (see for example Emmonds and Schmid, 2000) and, therefore, have to be included in the analyses performed. Given the significance of competition coefficients in the relationships before and after deregulation, the

conclusion is that credit unions do affect the activities of both banks and savings banks. Nevertheless, as mentioned before, it is necessary to underscore that this relationship has not been competitive across all years in our sample.

## **5. Conclusions**

This research analyzes the competitive process among the financial intermediaries that have operated in the Spanish banking system for the last 30 years. This long period is especially interesting because it includes a number of liberalization measures that have profoundly affected banking activities and banking firms. In fact, it has traditionally been argued that rivalry before deregulation was scarce and that the new rules have completely changed the competitive landscape within the industry.

Our analysis departs from conventional economic approaches by applying a sociological model borrowed from population ecology and performs SURE estimation to consider the possible interdependencies among the different types of firms that compete in the market. It is also important to highlight that, contrary to previous studies, we do not analyze individual firms; instead, we consider rival populations that share some common elements. This homogeneity within the groups (and heterogeneity across groups) has led some previous work to consider them independently when analyzing rivalry in the banking industry. Although most researchers agree that in recent years convergence has been evident, they typically consider only within-group rivalry when evaluating competition during the 1980s and early 1990s.

Our empirical analysis allows us to extract some interesting conclusions concerning rivalry in the banking industry. First, we confirm that deregulation has changed competitive conditions within the industry. Our results show a clear structural change in competitive interactions among the different populations that, in the case of Spain, can be located around 1989. Second, it is also important to highlight that this structural change has not been as dramatic as is sometimes argued. Although it is true that there is a different competitive pattern before and after 1989, the interactions between the three considered populations were important even before 1989. Our results show, for example, that savings banks and credit unions were fierce competitors before 1989, while the effect of credit unions on savings banks has been positive since 1989. However, this symbiotic behaviour after deregulation is not surprising given that, before 1989, both populations often competed for the same market niches with no possibility of expanding activity outside their home markets. Once the restrictions were lifted, both groups (especially the savings banks, whose geographic expansion has been stronger) expanded their market domains, diminishing competition in the local markets where they traditionally competed.

Finally, our results also suggest that we must be careful when we evaluate banking strategies or efficiency. Very often, these types of analysis are conducted only for a group of intermediaries with the implicit argument that the firms have

different objectives, history or market niches. To the extent that competition (and thus, banking strategies or efficiency) is affected by the interaction among several populations, the isolation of only one of these groups may bias the results obtained. Of course, our analysis has been performed in a context that may be different from other banking systems. However, it is important to note that Spain is one of the European countries where banking activities had traditionally been more clearly segmented. Thus, if even in cases such as Spain the interaction among populations are significant, future banking studies should include all relevant banking intermediaries in order not to bias conclusions.

Finally, note that since our analysis does not consider individual banks, our results are not directly comparable to studies that evaluate banking behaviour at the firm level, and the variables which explain firm competition may be different from the ones used in this research. Therefore, our investigation should be viewed as a complement and not a substitute of more traditional research, for example, in industrial organization economics.

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