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DEREGULATION**

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**FUNDACIÓN DE LAS CAJAS DE AHORROS
DOCUMENTO DE TRABAJO
Nº 620/2011**

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.

ISSN: 1988-8767

La serie **DOCUMENTOS DE TRABAJO** incluye avances y resultados de investigaciones dentro de los programas de la Fundación de las Cajas de Ahorros.
Las opiniones son responsabilidad de los autores.

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Abstract

This article proposes a dynamic localized competition model in which the key determinants of competition vary over time. When configuring their activities, firms must simultaneously respond to the expectations held by their institutional context and to the technical demands of their activities. Accordingly, we focus on institutional and technical dimensions as determinants of the competitive map. Our research is conducted in the Spanish Banking sector in the period 1991-2009, immediately after an unprecedented deregulation process. Our findings demonstrate that competitive patterns change after an external shock. Furthermore, we conclude that in dynamic environments competitive patterns may not be appropriately analyzed taking a static perspective.

Key words: Deregulation, localized competition, growth, profitability

JEL Classification: G28, L22

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Acknowledgements: This research was supported by the Spanish Ministry of Science and Technology and FEDER (project ECO2008-04129), and the *Diputación General de Aragón* (S09/PM062)

1. INTRODUCTION

One of the basic premises in strategic management is that firms within an industry are not homogeneous. Instead, the literature shows that there is a limited set of organizational forms, defined as configurations of strategies, structures and goals that identify the firm as a distinct entity, and classify it as a member of a group of similar organizations (Romanelli, 1991; Short, Payne & Ketchen, 2008). From an organizational ecology perspective, the existence of a few organizational forms influences competitive patterns. Firms of the same organizational form depend on the same resources for the development of their activities and, as a result, compete more intensively among them than with firms belonging to other organizational forms (Hannan & Freeman, 1977). This conception of the competitive process has been developed in localized competition theory (Baum & Mezías, 1992; Ranger-Moore, Breckenbridge & Jones, 1995). The underlying idea of this theory is that firms that are similar along a set of relevant organizational dimensions (as it happens with firms sharing the same organizational form) develop their activities in a similar way, resulting on a high overlap among their resource requirements (Baum & Oliver, 1992; 1996).

This research proposes two different perspectives on which firms may be homogeneous: a technical one and an institutional one. From a technical perspective, firms are similar when they share core organizational characteristics such as size, scope or technology (Dobrev, 2007). From this perspective, competition should be localized on a technical definition of an organizational form (e.g. large and small firms, minimills and integrated mills, factory and craft production). The second perspective stresses that firms are embedded in social systems. As a result, they are subject to institutional pressures that impose restrictions on their behavior. Eventually, institutionally endorsed behaviors replace technically driven rational decisions, leading to isomorphism among the firms that populate the industry (Tolbert & Zucker, 1983). Therefore, competition could also be localized on an institutional definition of organizational form (e.g. private and public hospitals; profit and non-for-profit organizations, conservative and progressive newspapers). Firms perform their activities according to both technical and institutional imperatives. Thus, the resources required for every firm to carry out its activities depend on both conditionings, and competition may be simultaneously localized on technical and institutional definitions of organizational form.

The interplay between both perspectives becomes of prime concern to understand competition in contexts where external shocks alter institutional environments or technical conditions. For instance, many industries have been subject to deregulation processes in the last decades. Deregulation settles the beginning of an institutional evolution: restrictions on certain activities are lessened. With lower institutional pressures each firm enjoys greater

freedom to define its operations, which, as we will discuss, results on a preference for technical criteria. Therefore, after deregulation we expect institutional definitions of organizational form to become less relevant, and technical definitions to gain importance as a determinant of competition. However, institutions are persistent and difficult to reverse (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Therefore, we expect a progressive shift, rather than a sudden shock on competitive patterns.

This article explores how deregulation affected the relative importance of each definition of organizational form and, in turn, the resulting competitive patterns. We borrow from organizational ecology to analyze competition (Carroll & Hannan, 1989; Hannan & Freeman, 1977; 1989). Organizational ecology has proven to be a powerful tool for the analysis of competition among firms belonging to different organizational forms (e.g., Baum & Mezías, 1992; Baum & Oliver, 1996; Baum & Singh, 1994a, 1994b; Miller & Eden, 2006). In our investigation we borrow from density dependence (Carroll & Hannan, 1989; Hannan & Freeman, 1989) and localized competition theory (Baum & Mezías, 1992; Ranger-Moore et al., 1995) to explore how both institutional and technical definitions of organizational form influence the intensity of competition among different firms.

Our research is conducted on the Spanish banking sector in the period 1991-2009. This is a mature industry that was subject to a tight regulation until the last quarter of the 20th century, when it faced a deregulation process. Formal laws traditionally established a clear distinction among three kinds of agents: credit unions, savings banks and commercial banks. However, after deregulation firms were allowed to freely choose the kind of activities they wanted to perform and the businesses in which they wanted to be. In this context, two important conditions coexisted: there were strong collective identities among the three different kinds of agents and, at the same time, the possibility to configure their activities at their will. Therefore, this setting is an ideal scenario to explore the effect of technical and social influences on competitive patterns.

Our results show mixed support to our theoretical model. On one hand, we find no evidence of localized competition in the case of institutional dimension. On the other hand, we find strong confirmation to our contention that the technical dimension becomes progressively more important as determinant of localized competition. This pattern is consistent with our argument that the Spanish banking sector after deregulation progressively shifted from a highly institutionalized environment to an environment subject to strong market pressures.

The paper is structured as follows. In the next section we briefly summarize the organizational ecology perspective of competition. The third section describes our research hypotheses. Next, we present the empirical setting, detailing its historic evolution and its most relevant institutional and technical features. The following sections present the

methodology and show the results. The article concludes with a discussion of the main implications.

2. ORGANIZATIONAL ECOLOGY AND LOCALIZED COMPETITION

In this section we briefly describe organizational ecology theory, because it is the perspective employed to develop our theoretical model. In organizational ecology the performance of an organization depends on its ability to gather resources from its environment. A resource is any factor the organization requires for the successful development of its activities, such as raw materials, technologies, funding, labor, customers or governmental support. The availability of these resources determines the maximum number of firms that can successfully operate in the environment, i.e., the carrying capacity.

Organizational ecologists have developed many models to analyze competitive patterns among organizations and the resulting population dynamics (e.g. Baum, 1995). Two of these ecological models of competition are especially useful for the analysis of competition among and within organizational forms: density dependence and localized competition. Density dependence (Carroll & Hannan, 1989; Hannan & Freeman, 1989) is the basic ecological model of competition. This model describes how the number of organizations (i.e. density) operating in an industry influences the availability of resources to current and prospective participants as a result of two processes: legitimation and competition. As the number of organizations operating in an industry increases, the visibility and acceptance of their activities grows, enhancing their constitutive legitimacy. With greater legitimacy resource holders are more willing to provide firms with their resources (Ashforth & Gibbs, 1990; Suchman, 1995). However, the number of participants also increases competition for resources. The entry of additional firms increases the frequency and strength of competitive interactions. As density increases, competition grows more than proportionally, given that firms not only have to compete for resources, but also capture resources from other organizations. Considering the combined effect of legitimation and competition the relationship between density and resource availability has an inverted-U shape. At low levels of density, the legitimation effect dominates the competition effect and resource availability is positively related to density. At high levels of density, legitimacy reaches its limit, while competition intensifies, resulting on a negative relationship between density and resource availability.

The initial formulation of the density dependence model applies to nascent industries, where the number of organizations is low enough to create uncertainty on resource holders over the activities they perform. Later developments of the model have focused on describing changes in the patterns of density dependent over the lifetime of the industry. On the one hand, the persistence of the industry generates constitutive legitimacy (Barnett, 1995), and over time the activities that are developed become taken-for-granted (Aldrich & Fiol, 1994).

Therefore, in mature industries the addition or reduction of firms is irrelevant for legitimacy. On the other hand, within-industry structures develop over time. Firms acquire their own identities, reputations or statuses, and there is a “*shift from diffuse ecological competition to focused rivalry between organizations that occupy similar positions in the industry*” (Hannan, 1997:203). This implies that competition stems from firms occupying similar positions in the industry. Therefore, in mature industries the localized competition model becomes especially suitable.

The localized competition model (Baum & Mezías, 1992; Ranger-Moore et al., 1995) extends the density dependence model by explicitly considering that firms are heterogeneous in the activities they develop. The resources required by every firm to develop its activities are defined by its productive capabilities, activities carried out and products and services offered to a selected set of customers in a particular geographic location (Baum & Oliver, 1996; Baum & Singh, 1994a, 1994b). Therefore, firms that develop a similar configuration of activities depend on the same resources. As a result, competition is more intensive among firms that develop their activities in a similar way than against firms with very different configurations of activities (Barnett, 1991).

The original purpose of organizational ecology was to study variations on population sizes over time. This is usually done by studying founding (entry) and failure (exit). As a result, the most frequent firm-level performance measure in organizational ecology is the failure rate¹. However, firms can resist long periods of resource deprivation, especially when they are endowed with slack resources or enjoy substantial support from powerful constituents (Barnett, 1997; Hannan et al., 1998). Thus, failure can be seen as the final outcome of several periods of below-average profitability and reduced (or negative) growth. Conversely, growth and profitability reflect contemporaneous variations in resource availability. The conventional arguments in organizational ecology refer to the ease with which an organization mobilizes and secures resources, and how this influences its activities. These arguments can easily be extrapolated to profitability or growth: high resource availability fosters growth and increases profitability, and the opposite applies to resource scarcity (e.g., Boone, Carroll & Witteloostuijn, 2004). Therefore, profitability and growth are appropriate firm-level performance measures for ecological models of competition in contexts where institutions, powerful constituents or firm characteristics prevent organizational failure.

3. HYPOTHESES DEVELOPMENT

In this section we describe our dynamic perspective on localized competition. The position occupied by the firm in the resource space is a result of its decisions in terms of the

¹ Founding rate, in opposition to failure rate, is studied as a population-level outcome rather than a firm-level outcome, due to the fact that previously to the founding event there is no unit to observe and to which attribute the outcome.

activities it is going to perform and how they are going to be performed (Baum & Oliver, 1996). In the first part of the section we argue that these decisions are made balancing social expectations and technical requirements, resulting on localized competition on both dimensions. In the second part we explore how as institutional restrictions are lessened after deregulation, the behavior of the firm progressively aligns with rational technical requirements, influencing the localization of the competitive process.

3.1. Institutional and technical determinants of localized competition

Institutional support is critical for any firm: it influences the flow of certain resources, reduces uncertainty, and enhances survival. Institutional support depends on legitimacy, that is, on a “*general perception of organizational actions as desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions*” (Suchman, 1995:576). Legitimacy is provided by internal and external audiences that judge an organization as an appropriate way of doing business (Bitektine, 2011). Thus, each firm has strong incentives to conform to social expectations (Meyer & Rowan, 1977; Tolbert & Zucker, 1983). As a result, firms subject to similar social expectations will become isomorphic in their activities as they try to remain legitimate (Ashforth & Gibbs, 1990; DiMaggio & Powell, 1983). We will refer to these widely shared social expectations about firm activities as institutionally defined organizational forms.

In this context the concept of identity is central². Organizational identity consists of the “*social codes, or sets of rules, specifying the features that an organization is expected to possess*” (Hsu & Hannan, 2005:475). The importance of identities is that many relevant resources, such as analysts’ coverage, governmental support, support from social movements, or preference among customers and prospective workers, accrue to firms that conform to a given identity (Baron, 2004; Pòlos et al., 2002). On the other side, firms sharing an identity will be direct competitors for these resources. Thus, we identify two sources of intense competition among firms sharing institutionally defined organizational form. First, isomorphic pressures lead them to converge in configurations of activities and resource required. Second, they will compete for certain resources controlled by audiences that have a preference for a given institutionally defined organizational form. Therefore, we advance the following hypothesis:

Hypothesis 1: *the density of firms of the same institutionally defined organizational form will have a negative effect on firm performance*

² Researchers on organizational identities define organizational forms as collective identities shared by a group of firms (Hsu & Hannan, 2005; McKendrick et al., 2003; Pòlos et al., 2002). This conception is close to what we call institutionally defined organizational forms. To distinguish between institutional and technical restrictions on configurations of activities, structures and goals, we will distinguish between institutionally and technically defined organizational forms.

The activities performed by the firm are not totally determined by institutional factors. Instead, the activities carried out by the firm also respond to technical requirements that result from the need to operate in a competitive market (Kraatz & Zajac, 1996). Core operational features, such as scale of activity, scope of operations or technologies used influence the activities developed by each firm. Therefore, firms sharing the same core technical characteristics are more likely to operate in a similar way than firms with different operational characteristics. As a result, there will be higher similarity on resource requirements among firms with similar operational characteristics. We refer to the different kinds of organization that can be identified according to salient operational and technical features as technically defined organizational forms. Accordingly, competition will also be localized on technical definitions of organizational form (Baum & Mezias, 1992; Baum & Singh, 1994a).

Hypothesis 2: *the density of firms of the same technically defined organizational form will have a negative effect on firm performance*

Therefore, patterns of localized competition will be simultaneously affected by institutions, which define activities that the firm has to embrace to secure the flow of certain critical resources, and by technical requirements, which stem from material limits on the activities that the firm can perform. Material restrictions result from the very nature of the activities developed and the necessity of being efficient and effective. In contrast, institutions are established by social audiences that actively punish deviation (Aldrich & Fiol, 1994). While material restrictions are ubiquitous, institutional restrictions can be increased or lessened. Therefore, the relative importance of technical and institutional determinants of localized competition depends on the intensity with which institutional restrictions are supported. In the following section we discuss a common instance by which institutional restrictions are lessened: deregulation.

3.2. Localized competition after deregulation

Among the different institutional restrictions that can exist on firm behavior, those based on government regulation are the most effective, as established institutions endowed with coercive capabilities actively screen compliance and enforce alignment with legal requirements (DiMaggio & Powell, 1983). Regulatory changes are likely to result on the deinstitutionalization of practices based on previous regulation (Oliver, 1992), reducing restrictions on firm behavior. In the case of deregulation, legal restrictions are lessened or completely repealed. Consequently, social constraints on how firms configure their activities weaken. In terms of our previous reasoning, this means that in a deregulated context convergence in activities is less intensively enforced, resource requirements are less influenced by institutional restrictions and the competitive process is less localized on institutionally defined organizational forms.

The effect of deregulation on social constraints is not immediate. Deregulation reduces institutional restrictions that stem from legal mandates. However, there are other institutional sources of isomorphic pressures, such as professional associations, public opinion, industry analysts or labor markets. These other sources are not directly affected by deregulation. Therefore, whether social constraints are eventually dissipated after deregulation, and the rate at which this occurs, depends on the strength of the informal constraints imposed by the many institutional audiences on which the firm depends.

The strength of social constraints depends on the ease with which audiences perceive the identity of each organizational form as different (Hsu & Hannan, 2005). A strong identity requires similarity in core dimensions among firms pertaining to the form, high average distance with different forms in salient characteristics, and clear prototypical cases (Baron, 2004). Otherwise, audiences find it difficult to judge whether a firm is conforming to its identity and are unlikely to penalize deviation. After deregulation, organizational form boundaries are progressively eroded as firms develop activities previously reserved to other organizational forms. As differences among members of each institutionally defined organizational form reduce, social constraints weaken. Thus, deregulation initiates a process by which institutionally defined organizational forms progressively lose relevance as determinants of activity configuration and resource flows³. This process implies a gradual reduction on the intensity with which competition is localized within institutionally defined organizational forms.

Hypothesis 3: *After deregulation, the negative effect of the density of firms of the same institutionally defined organizational form on performance will progressively become smaller (less negative)*

Institutionalized activities and processes tend to be incompatible with the optimization of efficiency (Oliver, 1992). That is, the decisions that would be made and the activities that would be implemented following technical criteria frequently differ from those supported by formal and informal institutions (D'Aunno, Succi & Alexander, 2000). Therefore, social expectations can be considered artificial constraints on firm activities and in the absence of social pressures, activities would be configured according to technical considerations. After deregulation technical factors will become increasingly important determinants of the configuration of activities as a result of the gradual lessening of social constraints. However,

³ We assume that there is no perfect convergence among technically and institutionally defined organizational forms. If both definitions converge, identities are not weakened after deregulation, as technical and institutional requirements would perfectly overlap and firms would have no incentive to vary its configuration of activities. However, a traditional assumption held by institutional theorists is that legitimated rules and activities tend to be incompatible with efficient and effective task performance (Meyer & Rowan, 1977; Oliver, 1992; Tolbert & Zucker, 1983). Therefore, our assumption that institutionally defined and technically defined organizational forms do not perfectly overlap is consistent with received theory.

the same way the firm cannot immediately abandon socially accepted templates; it cannot immediately embrace technically efficient configurations of activities.

Institutional restrictions not only establish ways to operate that are endorsed by the social context. Institutional restrictions also result from explicit accounts of behaviors and activities that legitimate organizations should not embrace (D'Aunno, Succi & Alexander, 2000). If an organization implements activities that are deemed illegitimate by its social system, the cost associated to the loss of institutional support may exceed the benefits associated to the operational benefits of the new practice (Meyer & Rowan, 1977). As a result, the implantation of the most efficient and effective practices must parallel the process by which institutional restrictions are lessened. Consequently, convergence of activities around technically defined organizational forms will occur progressively. This implies that competition for resources will become progressively more localized on technical definitions of organizational form. Thus, we advance our fourth and last hypothesis:

Hypothesis 4: *After deregulation, the negative effect of the density of firms of the same technically defined organizational form on performance will progressively become larger (more negative)*

4. RESEARCH SETTING

4.1. The Spanish banking sector

Our research is conducted in the context of the Spanish banking sector between 1991 and 2009. During most of its history the sector was subject to a strict regulation. There were restrictions on rates and commissions, firm entry or founding, branch opening, investment coefficients on specific activities and cash ratios. These restrictions established different rights and duties for the three types of agents in the sector: savings banks, commercial banks and credit unions, enforcing a clear demarcation in their activities and missions.

In the last quarter of the 20th century Spain had to adapt its banking regulatory framework to European standards as a condition to join the European Union. Thus, in 1978 restrictions on foreign banks entry were reduced, and in 1986 restrictions on their activities were repealed. In 1988 the activities allowed for each type of bank were homogenized. Other relevant restrictions were revoked in the same decade: rates and commissions in 1987, entry and founding in 1988, branch opening between 1985 and 1988, and investment coefficients between 1985 and 1989. Also, cash ratios requirements were lessened in 1990. Consequently, regulatory differences had virtually disappeared by 1990, and each agent may potentially develop the same activities.

4.2. Institutionally and technically defined organizational forms

A number of institutional mechanisms generated sustained differences among the three kinds of banking firms. First, banking regulation traditionally restricted the activities that

each agent was allowed to perform. Second, the historical roots of each agent, their traditional links to different institutions, and their missions have been homogeneous within each agent, and heterogeneous to different agents. Third, each agent has its own linguistic label, which is systematically used by social audiences. Fourth, there are professional associations that reinforce the differential character of the three types of banking firm. Consequently, each kind of agent has its own collective identity and commercial banks, savings banks and credit unions can be considered three institutionally defined organizational forms in the Spanish banking sector.

Regarding technical features, our argument is that the main differences on activities among banks are related to size. Previous research documents systematic differences in information gathering and processing (Berger et al., 2005), choice of location within towns and regions (Brickley, Linck & Smith, 2003), targeted customers (Berger et al., 1995, 2001; Haynes, Ou & Berney, 1999) or credit conditions (Cole, Goldberg & White, 2004). Therefore, in the Spanish banking sector size seems to be an appropriate technical dimension to define organizational forms. As we describe in the methodology section, we will distinguish three technically defined organizational forms: small banks, medium banks and large banks.

5. METHODOLOGY

5.1. Model specification

In this research we take growth and profitability as firm performance measures. It may be argued that failure is the main firm level performance measure in organizational ecology research. However, failure may be avoided by direct action of powerful institutional actors. In the research context, for instance, at the beginning of the global crises in 2008 the Spanish government constituted a 30 billion Euros fund to recapitalize banks with solvency problems. In these cases, failure may not occur, but reduced profitability and low or negative growth could still be observed. Consequently, short-term performance measures are especially suitable for studies conducted on industries where powerful constituents, as the government or other organizations, protect firms from selection pressures.

To test our predictions about the effect of density on growth we propose a proportional growth rate model (e.g. Barron, West & Hannan, 1994; Boone et al., 2004). In this model, the growth rate depends on the size of the firm in period t , and an exponential function of other variables:

$$\frac{Size_{i,t+1}}{Size_{i,t}} = r_{i,t} Size_{i,t}^{\beta_1} \exp(\varepsilon_{i,t+1}) \quad (1a)$$

where

$$r_{i,t} = \theta_i \exp\left(\sum_{i=1}^k \beta_i X_{i,t}\right) \quad (1b)$$

In equation (1b), $X_{i,t}$ represents other explanatory variables, $\varepsilon_{i,t+1}$ is the error term, and θ_i is a constant term. To account for firm level heterogeneity we allow this term to be firm-specific. The model is simplified using a log-transformation. Rearranging the terms, the equation to be estimated is the following:

$$\ln(Size_{i,t+1}) = (\beta_1 + 1)\ln(Size_{i,t}) + \sum_{i=1}^k \beta_i X_{i,t} + \alpha_i + \varepsilon_{i,t+1} \quad (2)$$

To test our predictions about the effect of density on profitability we propose a simple model in which profitability depends linearly on the explanatory variables. As in the case of growth, we consider firm-specific constant terms to account for firm level heterogeneity.

$$Profitability_{i,t+1} = \alpha_i + \sum_{i=1}^k \beta_i X_{i,t} + \varepsilon_{i,t+1} \quad (3)$$

5.2. Sample

Our sample covers the period 1991-2009. The number of firms included in each year fluctuates between 146 and 211. The sample excludes banks that do not exceed four branches in any of the years, because this is associated to extreme geographical specialization and insignificant retail activities. The sample also excludes banks without headquarters in Spain, because these banks do not publish information on their activities in the Spanish subsidiary (these banks are very small, so the minimum number of branches criterion also tends to exclude them). In spite of these exclusions our sample is clearly representative of the Spanish banking sector. For instance, in 2009 our sample includes 97.8 percent of aggregated assets in the sector. Our sample initially includes 3,364 firm-year observations.

The data used in the analysis has been gathered from publicly available sources. Bank level data is obtained from reports and statistical bulletins published by each of the professional associations of the sector at the end of each year (CECA, AEB, UNACC). Information on market level factors and on other macroeconomic variables is obtained from the Statistical Bulletin of the Bank of Spain and the National Institute of Statistics (INE).

5.3. Dependent variables

As mentioned before, to test out hypotheses we analyze two short-term performance measures: *firm size* and *profitability*. In organizational ecology *size* has been normally measured as scale of operations, that is, actual volume of activities carried out by the firm (e.g. Dobrev, 2007). Consistent with previous research in the banking sector, we measure *size* as total assets (Barron et al., 1994). *Profitability* is measured with an accounting based measure: return on assets (ROA), computed as the ratio of profits before taxes to total assets. *ROA* has frequently been used as the financial performance measure when analyzing the banking sector (see, for instance, Roberts & Amit, 2003). Due to the tight

monitoring activities of the Bank of Spain, accounting based measures of assets and profitability are highly reliable and comparable among the different types of organizations that operate in the sector.

5.4. Independent variables

The main independent variables are *institutional form density* and *technical form density*. To measure these variables we firstly have to identify the markets in which each bank operates. Retail banking markets are geographically bounded (Simons & Stavins, 1998). The relevance of geographical limits have been confirmed for a wide array of retail banking services, such as credit accounts (Kwast, Starr-McCluer & Wolken, 1997), consumer deposits (Sharpe, 1997), commercial loans (Hannan, 1991), small business loans (Cole & Wolken, 1995) and mortgages (Rhoades, 1992). The relevant market for a branch is larger than the zip code or the city, and smaller than the national market (Radecki, 1998). Consequently, in this research we define markets geographically, at the province level⁴. We consider that the relevant market of the bank is formed by all the provinces in which it operates a branch.

To test hypothesis 1 we include the variable *institutional form density*. This variable is calculated as the total number of banks of the same institutionally defined organizational form (savings banks, commercial banks, credit unions) that operate in the relevant market of the focal bank. To test hypothesis 2 we create a variable labeled *technical form density*. This variable is calculated as the total number of banks of the same technically defined organizational form that operate in any of the provinces in which the focal firm operates. We distinguish among three size groups in the population: large, medium and small banks. We base our criterion on previous studies in the Spanish banking sector (e.g., Freixas, 1996; Más-Ruiz et al., 2005). We set total asset ranges that approximately generate the same classification as those studies. More accurately, our ranges are total assets < 4,446 million Euros for small banks; total assets between 4,446 million and 21,425 million Euros for medium banks; and total assets > 21,425 million Euros for large banks (constant Euros of 1991).

To test hypotheses 3 and 4 the variables *institutional form density* and *technical form density* are interacted with a linear time trend that takes the value 1 in 1991 and increases by one each year. Our interaction terms are calculated using centered variables (Aiken & West, 1991)⁵.

⁴ Spain is divided into 50 provinces.

⁵ We center the continuous density variables on the mean value. The discrete time trend is centered on 10, the middle point of our 19 years observation window. This is done to facilitate the interpretation of the direct effects.

5.5. Control variables

The model includes many variables to control for the carrying capacity of the environment. We include *credits*, measured as the aggregated credits of the provinces where the focal firm operates (in thousands of Euros). This variable approximates the total demand of banking activities. *Rate* is the interest rate in the interbank market. It influences the rate banks charge on loans and the returns paid for deposits. *Crisis* is a dummy variable that takes the value 1 for economic recession periods (from 1992 to 1995 and for 2008 and 2009). We include a time *trend*. This variable is meant to control for effects on carrying capacity not explicitly captured by other covariates. We also include *accounting change*, a dummy variable that takes the value 1 in 1992 and 2005, years in which accounting regulation changed. The new regulations resulted on variations on the valuation of assets. This variable controls for potential distortions in the year in which the regulations are introduced. Furthermore, we include *total density* to control for diffuse (“non-localized”) competition. *Total density* is measured as the number of banks that operate in the relevant market of the focal bank, without distinction of technical or institutional form.

We also include several controls at the firm level. In the period analyzed there was an unprecedented geographical expansion of banking activities. Each bank entered a number of markets, increasing direct interactions with other banks. We include *multimarket contact* to control for the potential collusive behavior that may result from interaction in multiple markets. This variable is measured as the average number of markets where focal firm coincides with its competitors. *Age*, measured as the number of years since the founding of the focal firm, captures age dependent dynamics. We also include two measures specific of the banking sector: *risk*, measured as the ratio total credits to total assets, and *efficiency*, measured as the ratio exploitation costs to ordinary margin (Carbó, del Paso & Fernández, 2003). These variables capture time varying characteristics of the activities of the bank.

We control for the logarithm of total assets, $\log(\text{total assets})$, and for profitability, *ROA*. Both variables are lagged one period. In the growth model, the logarithm of total assets is a requirement of the specification. Lagged profitability controls for the potential substitutability between growth and profitability objectives. In the profitability model, the logarithm of total assets is included to control for the scale of operations. Lagged profitability is included to control for the persistence of the profits obtained by each bank, which are heavily dependent on long-term relationships with customers (e.g. mortgages).

Finally, in the period analyzed there were a number of mergers and acquisitions (M&A). In the year in which an M&A takes place we expect a punctual positive shock on firm growth (acquisition of assets) and a negative shock on profitability (costs of the operation). Also, in the year following an M&A we expect a negative effect on both growth and profitability as banks normalize their activities. Therefore we include two dummy variables: *M&A*, which

takes the value 1 for those firm-year observations involved in M&A and 0 otherwise, and *post M&A*, which takes the value 1 in the period after the M&A. Table 1 shows descriptive statistics and correlations.

Table 1: Descriptive statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	-										-					
Minimum	13.60	7.16	961.69	1.24	0	0	16	1	1	0	16.87	1	0	0	1	2
Mean	0.97	13.74	159312.2	5.72	0.33	0.11	114.35	3.30	61.21	0.57	0.74	9.49	0.02	0.02	42.25	65.72
Maximun	19.49	19.30	661894.4	14.51	1	1	201	13.07	292	0.99	99.19	19	1	1	92	178
S.D.	1.38	1.83	147533.7	3.70	0.47	0.31	46.68	2.89	46.40	0.21	2.22	5.44	0.12	0.13	27.55	43.72
1. ROA	1.00															
2. Log(total assets)	-0.06	1.00														
3. Credits	-0.16	0.69	1.00													
4. Rate	0.10	-0.17	-0.26	1.00												
5. Crisis	-0.01	-0.08	-0.09	0.58	1.00											
6. Accounting Change	0.01	-0.02	-0.02	0.32	0.20	1.00										
7. Total density	-0.09	0.63	0.69	0.05	0.04	-0.00	1.00									
8. Multimarket Contact	-0.12	0.70	0.87	-0.10	-0.02	-0.01	0.65	1.00								
9. Age	0.06	0.22	0.13	-0.06	-0.04	-0.01	0.12	0.15	1.00							
10. Risk	0.02	0.18	0.16	-0.39	-0.24	0.01	-0.05	0.06	0.05	1.00						
11. Efficiency	-0.14	-0.08	-0.01	0.00	0.02	-0.01	0.04	-0.02	0.01	-0.09	1.00					
12. Trend	-0.15	0.23	0.42	-0.81	-0.40	-0.08	-0.07	0.18	0.07	0.49	-0.00	1.00				
13. Post M&A	-0.00	-0.02	-0.03	-0.03	-0.03	-0.02	-0.02	-0.03	0.01	0.01	-0.01	0.01	1.00			
14. M&A	0.00	-0.03	-0.03	-0.02	-0.01	0.03	-0.02	-0.03	0.01	0.01	-0.00	-0.01	-0.02	1.00		
15. Institutional form density	-0.06	0.47	0.55	0.11	0.07	0.01	0.85	0.52	0.18	-0.13	0.06	-0.14	-0.03	-0.03	1.00	
16. Technical form density	-0.02	-0.05	0.09	0.20	0.08	0.01	0.54	-0.03	-0.00	-0.12	0.07	-0.28	0.01	0.01	0.55	1.00

5.6. Estimation method

The main statistical problem in our models is one of endogeneity. First, banks choose the location of their branches and, consequently, the markets into which they expand. This choice is likely to be dependent, among other factors, on expected growth and profitability. Therefore, markets with high growth or profitability prospects are likely to attract many firms. This may result on a simultaneity bias: firms operating in fast growing, profitable markets may also experience high density, generating a spurious correlation between density and performance. Second, branching decisions are likely to be influenced by firm specific non-observable factors. The effect of these factors may be confounded with the effect of our theoretical variables if many firms make similar branching decisions based on such unobservable characteristics and these characteristics systematically influence performance. This implies an omitted variables bias, another form of endogeneity. Under these conditions OLS estimations are inconsistent.

We take a number of actions to deal with endogeneity. First, all the explanatory variables are lagged one period to alleviate the potential simultaneity bias. Second, we consider firm fixed effects (applying the within estimator). Hausman specification tests support this decision. Fixed effects alleviate omitted variables bias as long as the omitted variables are constant. However, it is difficult to assume that firm characteristics do not vary significantly over a 19-year period. Therefore, the fixed effects estimation does not sufficiently control for the omitted variables bias in our context. Third, we estimate the model by two stages least squares (2SLS). This estimation technique is performed in two stages. In the first stage the potentially endogenous variables are regressed against the other variables of the model and a set of exogenous (or at least predetermined) instruments. In the second stage the main equation is estimated, substituting the values predicted in the first stage for those of the potentially endogenous variables. The main property of these predicted values is that they are orthogonal to the error term (statistically “exogenous”). As a result, 2SLS provide unbiased estimations. We treat as potentially endogenous all the variables that measure density, including their interactions.

Instruments have to meet two conditions. First, the instruments must explain a significant part of the variance of the potentially endogenous variables (*relevance* condition). This is tested with the first-stage F statistic of the instruments (or a robust variant of it). This statistic has to take a value of 10 or higher. Second, the instruments must be uncorrelated with the error term in the main equation (*orthogonality* condition). This second condition is tested with the Sargan test (or its robust variant, the Hansen’s J Statistic). Under the null hypothesis, the instruments are orthogonal to the error term and, consequently, valid instruments. In our estimations we use internal instruments (i.e. lagged values of the potentially endogenous variables, which by definition are predetermined). To limit sample

attrition we employ the lower number of lags that fulfils the relevance and the orthogonality conditions (two lags in our case). Note that after lagging the right-hand side variables and taking two cross sections as instruments, the number of firm-year observations effectively used reduces to 2,497.

6. RESULTS

Table 2 shows the estimates of the growth and profitability equations. The first three columns show the growth models and the last three columns their profitability counterparts. Instrument validation tests are shown at the bottom of the table. Columns 1 and 4 show the baseline model, which only includes the control variables. The baseline model is globally significant in both cases, confirming the relevance of the controls introduced. Columns 2 and 5 include the direct effects of *institutional form density* and *technical form density* (hypotheses 1 and 2). None of these variables is significant, and their addition does not improve the fit of the model, as the Wald test in the bottom of the table shows. The lack of significance seems not to result from multicollinearity, as the VIF associated to the theoretical variables ranges between 2.86 and 3.98, and the mean VIF of the model is 3.69, well below of the rule of thumb of 10.

Table 2: 2SLS estimations of growth and profitability models

	Growth Model			Profitability Model		
	(1)	(2)	(3)	(4)	(5)	(6)
ROA_{t-1}	-0.000802 (0.0064)	-0.000709 (0.0064)	-0.000855 (0.0064)	0.286* (0.1605)	0.286* (0.1604)	0.286* (0.1603)
Log(total assets)_{t-1}	0.776*** (0.0600)	0.777*** (0.0601)	0.771*** (0.0603)	-0.919 (0.5995)	-0.944 (0.6044)	-0.970 (0.6105)
Credits^a	-0.0587 (0.137)	-0.0231 (0.135)	0.131 (0.234)	-0.998 (3.11)	-1.53 (3.21)	-1.71 (5.09)
Rate	-0.00482 (0.0034)	-0.00511 (0.0035)	-0.00733** (0.0036)	-0.0578 (-0.0759)	-0.0593 (0.0757)	-0.0651 (0.0812)
Crisis	-0.0104 (0.0126)	-0.0112 (0.0125)	-0.0186 (0.0128)	-0.172 (0.1614)	-0.164 (0.1608)	-0.182 (0.1534)
Accounting Change	0.0606 (0.0246)	0.0605 (0.0245)	0.0592 (0.0249)	0.106 (0.1202)	0.0927 (0.1242)	0.0769 (0.1401)
Total density^b	-0.0553 (0.05)	-0.105* (0.06)	-0.0456 (0.06)	-0.000164 (0.60)	0.854 (0.70)	1.15 (0.79)
Multimarket Contact	0.0145 (0.0097)	0.0137 (0.0096)	0.00555 (0.0106)	0.0670 (0.1605)	0.0818 (0.1631)	0.0700 (0.2096)
Age	0.00608** (0.0026)	0.00625** (0.0026)	0.00675*** (0.0026)	0.0226 (-0.0552)	0.0213 (0.0554)	0.0224 (0.0554)
Risk	-0.0180 (0.1012)	-0.0223 (0.1027)	-0.0258 (0.1032)	-0.949 (2.0647)	-0.852 (2.0403)	-0.857 (2.0201)
Efficiency	-0.0127 (0.0155)	-0.0126 (0.0154)	-0.0125 (0.0154)	-0.587* (0.3131)	-0.587* (0.3116)	-0.587* (0.3108)
Trend	0.00897 (0.0062)	0.00866 (0.0059)	0.00419 (0.0070)	0.0309 (0.1759)	0.0257 (0.1736)	0.0218 (0.1998)
Post M&A	-0.00758 (0.0175)	-0.00485 (0.0173)	-0.00772 (0.0172)	0.00891 (0.0910)	-0.0150 (0.0920)	-0.0238 (0.0925)
M&A	0.0256 (0.0251)	0.0267 (0.0249)	0.0248 (0.0249)	-0.684 (0.5009)	-0.686 (0.4966)	-0.693 (0.4957)
Institutional form density^b		0.141 (0.14)	0.0598 (0.20)		-1.59 (1.04)	-1.41 (2.09)
Technical form density^b		0.00150 (0.03)	-0.0589* (0.01)		-0.434 (0.27)	-0.712** (0.16)
Institutional form density x Trend^b			0.00131 (0.03)			0.0563 (0.34)
Technical form density x Trend^b			-0.0121*** (0.00)			-0.0590* (0.03)
N	2497	2497	2497	2497	2497	2497
Adj. R²	0.86	0.86	0.86	0.08	0.08	0.08
F	1735.26***	1674.55***	1818.91***	10.92***	9.87***	8.84***
First stage F	151.23	53.68	12.63	151.23	53.68	12.63
Hansen's J Statistic	0.14	0.39	0.51	0.28	0.47	0.76
Wald test versus 1 or 3		1.67	4.03***		2.39*	1.48
Wald test versus 2 or 5			7.71***			2.28

Robust standard errors in parentheses

Hansen's j statistic shows p-values

Coefficient statically significant at *** 1%, ** 5% and * 10%

^a divided by 1,000,000

^b divided by 100

Columns 3 and 6 show the fully specified model in which *institutional form density* and *technical form density* are interacted with a time trend. In the growth model this new estimation obtains significant parameters for some of the theoretical variables, and the fit of the model improves significantly ($F=7.71$, $p<0.01$). In the profitability model, we also obtain significant effects, but the Wald test ($F=2.28$; $p=0.102$) suggests that the addition of the interaction terms does not improve the fit of the model significantly. Therefore, results from this last estimation must be taken with caution.

We test our hypotheses in the fully specified models. Hypothesis 1 stated that *institutional form density* has a negative effect on performance. This prediction is neither supported in the growth model ($\beta= 0.06$, n.s.) nor in the profitability model ($\beta= -1.41$, n.s.). Also, hypothesis 3 suggested that this effect would decrease over time. As the direct effect is predicted to be negative, the interaction term is expected to be positive. In both growth and profitability models the parameter has the expected sign, but it is not significant. Therefore, hypothesis 3 is not supported. The lack of support to both hypotheses suggests that institutionally defined organizational forms were not significant determinants of localized competition after deregulation.

Hypothesis 2 predicted that *technical form density* has a negative effect. The hypothesis is supported in both the growth ($\beta=-0.06$; $p<0.10$) and profitability models ($\beta=-0.71$; $p<0.05$). The parameter of the direct effect in moderated regressions must be interpreted as the total effect when the moderating variable has the value of 0 (Cohen, Cohen, West & Aiken, 2003). As the trend is centered on the middle point of the observation window, these effects correspond to period 10 (year 2000). Hypothesis 4 predicted that this effect is increasing over time. This prediction is also confirmed in both models ($\beta=-0.01$; $p<0.01$ in the growth model, and $\beta=-0.06$; $p<0.10$ in the profitability model).

Importantly, the analysis of the direct effect of a variable without considering its interaction effects is not recommended when the interaction terms are significant (Cohen et al., 2003). In our case, we find that the interaction term is significant in both the growth and the profitability models. We explore the effect of *technical form density* (TFD) at different relevant values of the moderating variable (Aiken & West, 1991). Particularly, we take the first third (year 6 after deregulation, or 1996) the second third (year 12, or 2002) and the end of the observation window (2009, year 19). In the case of the growth model we obtain the following effects (standard errors of the point estimates are shown in parenthesis):

$$\begin{aligned} \left[\frac{\partial \text{Growth}_{it}}{\partial \text{TFD}_{it}} \Big| \text{Year} = 6 \right] &= -0.01 (0.03) \\ \left[\frac{\partial \text{Growth}_{it}}{\partial \text{TFD}_{it}} \Big| \text{Year} = 12 \right] &= -0.08 (0.04) ** \\ \left[\frac{\partial \text{Growth}_{it}}{\partial \text{TFD}_{it}} \Big| \text{Year} = 19 \right] &= -0.17 (0.06) *** \end{aligned}$$

In the case of profitability, we obtain the following effects:

$$\left[\frac{\partial Profitability_{it}}{\partial TFD_{it}} \Big|_{Year = 6} \right] = -0.48 (0.27) *$$

$$\left[\frac{\partial Profitability_{it}}{\partial TFD_{it}} \Big|_{Year = 12} \right] = -0.83 (0.39) **$$

$$\left[\frac{\partial Profitability_{it}}{\partial TFD_{it}} \Big|_{Year = 19} \right] = -1.24 (0.59) **$$

Therefore, the results confirm that *technical form density* has a negative effect on profitability (hypothesis 2 supported) and that this effect is increasing over time (hypothesis 4 supported). Importantly, the effect of *technical form density* was not significant immediately after deregulation, which supports our contention that it took time for banks to adopt technical criteria in their strategic behavior. Particularly, the effect is not significant until 9 years after deregulation, in the case of the growth estimates, and 5 years, in the case of the profitability model.

7. DISCUSSION

Our objective in this paper has been to test the effect of deregulation on patterns of competition. When configuring their activities, firms have to satisfy market demands for efficiency and effectiveness and, at the same time, respond to social expectations about their activities (D'Aunno et al, 2000). We refer to the first class of pressures as the technical dimension. It determines configurations of activities that are adequate on pure technical grounds. We refer to the second class as the institutional dimension. It identifies configurations of activities that are deemed adequate within a social system. We propose that, as both criteria influence how firms configure their activities, firms that are occupying proximate positions in the technical or the institutional domain will depend on similar resources. Consequently, we predict that both dimensions should influence the pattern of localized competition. We also predict that, after deregulation, firms progressively abandon activities and behaviors previously endorsed by institutions, and modify their configurations of activities following rational technical criteria. As a result, competition progressively becomes more localized on the technical dimension (i.e. technically defined organizational forms) and less on the institutional dimension (i.e. institutionally defined organizational forms).

We find mixed support to our theoretical model. In the case of the institutional dimension we find no evidence of localized competition. In contrast, we find strong support to our contention that the technical dimension becomes progressively more important as determinant of localized competition. This pattern is consistent with our argument that the Spanish banking sector after deregulation progressively shifted from a highly institutionalized environment to an environment subject to strong market pressures, where technical criteria became central to competition.

Interpreting the results in the context of the banking sector leads us to propose an explanation for the absence of competition within institutionally defined organizational forms. Banks may have advanced the forthcoming institutional changes, and the regulator and the government may have provided banks with time and resources to prepare for the new scenario. Between the first changes in regulation in the 70's and the formal completion of the process in 1990 elapsed more than a decade, enough time for banks to prepare for the new scenario. As a result, by 1991 banks may have already abandoned the core features of their institutionally defined organizational forms, and the institutional dimension would have lost its relevance as determinant of localized competition. However, this would not explain why competition within technically defined organizational forms took still many years to emerge after deregulation; neither provides mechanisms by which informal institutions may have not been sufficient to generate competition within institutionally defined organizational forms.

An alternative explanation may be that before deregulation the institutional environment of the Spanish banking sector may have reduced –or even prevented– ecological competition for resources. There were professional associations for each kind of agent that included every organization operating in the sector. These associations may have acted as a mechanism to facilitate coordination among banks of each institutionally defined organizational form, moderating competition. As a result, during the regulated period ecological competition patterns may have not emerged. In contrast, after deregulation firms faced increasing competition from banks of the other types, banks with which collusive agreements were more difficult to establish. Therefore, the necessary conditions for ecological competition to arise would have occurred only after institutional factors weakened, when technical definitions of organizational form gained relevance.

Our findings advance our understanding of within industry competitive dynamics. A classical argument in strategic management is that not every firm in the industry generates the same competitive effect on a focal firm. Instead, depending on their location on the multidimensional strategic space, two firms will be closer or more distant competitors (see, for example, Chen (1996)). Applying organizational ecology theories of competition we confirm the existence of within industry competitive structures. The most important finding in this research is that competitive patterns are dynamic: they evolve over time not only in the firms that form the competitive group, but also in the intensity with which they generate competitive effects. In the Spanish banking sector we find that during the two decades that followed deregulation the competitive process became focused on firms of the same size, and that the competitive effect progressively increases over the period. Our findings imply that intra-industry competitive structures are heavily influenced by external exogenous forces that alter the factors that define rivals as close or distant competitors.

Our findings also contribute to community ecology, a basic research stream in organizational ecology. A traditional topic in this stream is the analysis of the emergence and extinction of organizational forms. The dominant approach is to investigate how new organizational forms emerge within a community in which other organizational forms are already in operation (e.g., Haveman, Rao & Paruchuri, 2007). The analysis tends to focus on firms introducing new organizational forms and the interaction between emerging and incumbent forms. In this article we propose a different perspective. Instead of analyzing the evolution of individual organizational forms, we analyze how a new classification of forms emerges and how it replaces the previous classification schema. We propose that there can be overlapping criteria to define organizational forms, at least for a transition period between the dominance of an incumbent classification (e.g., the traditional definition of institutional forms in the Spanish banking sector) and an emergent classification (based on technical criteria). In other words, we analyze how a wholly new categorical structure substitutes for the previous structure. This approach may be a useful perspective to analyze how exogenous shocks alter intra-industry social and competitive structures.

7.1. Conclusion

In this article we propose a dynamic localized competition model in which the determinants of the localization of the competitive process vary over time. We find that the whole competitive map in an industry can change as a result of an exogenous shock and that this change is progressive and extended over time. Our results show that ecology models of competition are a powerful tool for the analysis of competitive patterns in industries subject to exogenous shocks that can alter the basis of competition. We hope this article stimulates strategic management research that borrows from organizational ecology, and organizational ecology research that analyzes the specificities of competitive patterns on mature industries.

8. LIMITATIONS AND FUTURE RESEARCH

In this article we focus on industries that have been subject to a deregulation process. The absence of localized competition among institutionally defined organizational forms suggests that the ecologic competitive dynamics previous to deregulation may not be as we predict. Above we suggest two explanations: that the reduction on localized competition on institutionally defined organizational forms began many years before the deregulation process was complete (the anticipation argument), or that ecological patterns of competition did not take place among institutionally defined organizational forms during the regulated period (the collusion argument). It may be interesting to gather data on the regulated period to explore which of these explanations holds. If during the period between the first changes in regulation and the completion of the deregulation process there was a decreasing level of localized competition on institutionally defined organizational forms, then the anticipation argument holds, and our theoretical model is still valid. In contrast, if ecological patterns of

competition are not found in this period, it may be understood as evidence that in regulated industries ecological competition may not take place. This second case would have significant implications for both strategic management and population ecology perspectives on competition.

Deregulation is not the only exogenous shock that may alter within industry competitive structures. For instance, technological factors influence organizational forms (Mckendrick and Carroll, 2001). After a technological discontinuity new resource pockets are opened, and optimal configurations of activities may vary (Anderson & Tushman, 1990). As a result, technological discontinuities may open a period of transition between an incumbent and an emergent categorical structure of technically defined organizational forms. Changes in labor markets may also be an important exogenous shock. Firm identity, which is close to our institutionally defined organizational form concept, is influenced by employees (Baron, 2004). Also, dependence in similar labor markets generates ecological competition for resources (Sorensen, 2004). Changes in regulation that imposed or reduced restrictions on the employees that each organization can hire (e.g. being enrolled to an association, holding a specific degree, certifying knowledge on certain processes) may result on within-industry additional restrictions on configurations of activities and patterns of localized competition. A natural extension of our model is to explore how these other exogenous shocks influence the localization of the competitive process, or the speed at which emergent within industry structures substitute for incumbent structures.

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