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Entry in Independent Submarkets: An Application to the Spanish Retail Banking Market

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Abstract: This paper is aimed at the analysis of the banks' decisions to open branches in submarkets and, in particular, to test if these decisions can be considered mainly determined by what is happening in each submarket, irrespective of what has happened in other submarkets, as Sutton's independent submarkets model suggests. With data on the Spanish retail banking sector for the period 1994-98, I specify and estimate a discrete choice model to examine the entry probability of potential new entrants into submarkets. I find that the entry decisions of potential entrants are mainly determined by submarket characteristics, as opposed to entity-specific characteristics. This result is consistent with the assumptions of the theoretical model.

I INTRODUCTION

The Spanish retail banking sector is formed by a set of banks that show a high degree of asymmetry in the markets they cover: some of them are purely local and others cover nearly every local market. This, *a priori*,

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suggests that the Spanish bank market consists of a large number of independent local markets (i.e., districts, suburbs, towns, …) where branches of different banks[1] compete. Within this framework, it is possible to analyse the decisions of the bank entities to open branches in each local market using the model of independent submarkets developed by Sutton (see Sutton, 1998). This model assumes that a market consists of firms that compete in independent submarkets, and these independent submarkets can be, in particular, geographical. In each submarket, a firm will decide to enter new products depending on the strategic effects operating in the submarket. That is, firms' strategies in one submarket will be not a function of what has happened in other submarkets.

This work aims to analyse the entity decision to open branches in a submarket and, in particular, to test if this decision is determined by what is happening in each submarket, irrespectively of what has happened in other submarkets, as the theoretical model suggests, with data on Spanish retail banking sector. To do this, I will specify and estimate a discrete choice model to examine the entry probability of potential new entrants into submarkets for the period 1994-98.

Nowadays, several papers have developed detailed empirical models of oligopolistic entry. All of them estimate an equilibrium entry model applied to different industries. On the one hand, studies by Bresnahan and Reiss (1988, 1991 and 1994); Berry (1992) and Scott Morton (1999) have shed light on market and firm-market characteristics that influence entry and exit decisions. On the other hand, studies by Kadiyali (1996) and Toivanen and Waterson (1999) analyse the effects of market structures on entry. In contrast, this paper focuses on inferences about firm-specific sources of the expected profits in the presence of a large number of potential entrants. Moreover, it analyses the decisions of the potential entrants to open branches in local markets.

In particular, Spanish retail banking is a suitable and interesting industry on which to carry out this study for several reasons. First, the networks of branches held by banks are important and spread over all or part of the national territory. Second, the industry is highly concentrated and has even shown a recent tendency to become more concentrated. Finally, few empirical Spanish studies have analysed the determinants of the opening of branches per regional markets (see Fuentelsaz and Gómez-Villascuerna (1999) and Fuentelzaz, Gómez and Polo (1999)). But these studies only consider the decision to open savings bank branches in a region. On the contrary, this work studies the decision to open bank branches and savings bank branches in each

[1] Banks refer to the set of credit or deposit institutions as banks and savings banks.

local market. Hence, the level of bank operation is local market, while regional markets are an aggregation of these local markets.

The main empirical result is the following. The probability of potential new entrants to open branches in a submarket is mainly determined by the submarket characteristics more than by the entity-specific characteristics. This result is consistent with the hypothesis of the theoretical model.

The rest of the paper is organised as follows. Section II briefly sets the theoretical framework. Section III explains the empirical entry model applied to analyse the probability of opening bank branches per submarket. Section IV presents the empirical results and in Section V some concluding remarks are presented.

II THE MODEL

The theoretical model is a variant of the independent submarkets model developed in Sutton (1998), in which firms are considered to compete in prices. Sutton's model takes firms as competing across many independent submarkets. I assume that the national retail banking market consists of a large number of local markets[2] (i.e., districts, suburbs, towns …). Every one of these independent submarkets consists of several branches of different banks competing against each other. Submarkets can be taken as independent from the demand side in the sense that cross-price elasticities among submarkets are zero or very small.[3] Every branch is regarded as a variety of the bank services.

Under these assumptions, and analysing the process of entry as a dynamic game in each submarket[4] s. In the first stages of the game, each bank i makes its investments in branches and in the last stage of the game, banks set prices. There are N banks competing in opening branches over time. Bank investments in new branches are taken independently for each submarket and generate a flow of profit for each of them. Therefore, the total flow of profit per entity at each time is the sum of the flows that it gets in each submarket. At the submarket level, opening a new branch generates a sunk cost $\varepsilon > 0$, and a flow of profit Π_{is}^{e} that depends on the configuration of products present in it. Then, the bank's payoff per submarket is the net present value at time zero of

[2] The arguments that allow me to regard the retail banking sector as a submarket industry can be found in Juan (1998).

[3] Nulls cross-elasticities are likely to characterise the geographically separated submarkets (small towns and suburbs). Small elasticities are likely to be the rule in partially overlapped markets in more important consumer agglomerations (districts of cities).

[4] In each submarket, I suppose the population of consumers grows over time to some limiting level.

this profit stream, discounted at some given rate r, minus the net present value of the fixed costs incurred. In this framework, the "symmetry principle" is imposed. This restriction maintains that the strategy of a potential bank entrant in a submarket depends only on sunk costs and profit opportunities in this submarket. That is, there are no strategic linkages across submarkets. Moreover, branches supply the same banking services that can be taken as close substitutes. As such, submarket strategies for two possible entering firms have no reason to be different.

In each submarket, one bank will establish a new branch at time *t* when its bank payoff is non-negative. Therefore, this entry model assumes that the entry decisions of a bank entity (potential entrant) in one submarket depends on sunk costs and profit opportunities in this submarket, irrespective of its action or those of its rivals in other submarkets.

III DATA AND EMPIRICAL MODEL

The theoretical model assumes that the entry decisions of bank entities in one submarket depend only on sunk costs and profit opportunities in this submarket, irrespective of their payoffs in other submarkets. That is, these decisions are only a function of what is happening within the submarket. Accordingly, I will construct a model aimed at testing whether the entry decisions of bank entities per submarket are really determined by what is happening in each submarket, irrespective of what has happened in other submarkets. To do this, I will use an entry discrete-choice model.

The main data source used in this paper is the *Guía de Banca, Cooperativas de Crédito y Cajas de Ahorros*, which contains commercial information about the number of branches of every bank and savings bank in each Spanish town. According to this source, there were 5,176 Spanish towns endowed with banking branches and 220 entities during the period 1994-98. As a complementary source, I have also used the *Anuario Comercial de España*, which supplies socio-economic information for towns with more than 1,000 inhabitants (number of inhabitants, area, per-capita disposable income, …). Therefore, this source can be matched to a subset of the Spanish towns for which I will examine the consistency of the expected entities' profit per independent submarket with the "symmetry principle". To do this, we must identify the independent submarkets in the subset of towns. This identification was carried out in my previous paper (see Juan, 1998). According to the results of that study, in this exercise I consider the subset of towns with a population between 1,000 and 5,000 (1,757 towns), where 96 per cent of these towns were identified as a single submarket in my previous research.

The units of observation and analysis consist of each entity in each submarket at each point in time. I suppose that an entity can reenter in a previously abandoned submarket. I consider that a potential new entrant at time t is an entity which did not own branches in the submarket in the previous year *(t-1)*. At the beginning of the period, each entity is established in a subset of the S submarkets. Suppose that entity i is established in S_i submarkets. The decisions of this entity will be to open or not open branches in the remaining S-S_i submarkets. According to the theoretical model, these decisions are independent across submarkets. Then, the decisions of each potential new entrant per submarket will be taken according to the following framework

$$\begin{aligned} &\textit{If } (I_{is} = 0),\ E_{is} = 1 \textit{ if } \Pi^{e}_{is} \geq f \\ &\qquad\qquad E_{is} = 0 \textit{ if } \Pi^{e}_{is} < f \end{aligned} \tag{1}$$

If the entity i did not own branches in the submarket s in the previous year *(I_{is}=0),* it will decide between opening (E_{is}=*1*) or not opening (E_{is}=*0*) one branch[5] in this submarket according to its expected payoff within the submarket Π^{e}_{is}.That is, if the expected profit of entity i in submarket s is at least equal to sunk cost incurred on entry f, the entity i will open one branch in this submarket.

Now, it is necessary to define the structure of the expected entity's profit function to analyse these decisions. I will use a framework for the firm's profit function that is frequently employed.[6] This framework considers that a portion of profits is common to all firms and, that another portion varies according to firm-specific characteristics. The portion of a submarket's profit is likely to vary with submarket characteristics W_s as the level of demand, the size of the submarket and the level of rivalry within the submarket N_j. The extent to which the firm-specific portion of profit has an impact on profit is the central question I want to address. In what follows, I discuss the specification of this portion of profits.

Sutton's model implies that the expected entity's profit in the submarket must not differ among potential new entrants. However, it is important to take into account that the Spanish retail banking sector is an industry with a specific history, and that the entry opportunities for some competitors in some

[5] The multiple entries per entity are not considered in this study because they are empirically negligible.

[6] A framework used in several studies which analyses firm diversification decisions (see, for example, Lemelin (1982); Merino and Rodríguez (1997)). It is also applied in empirical studies that analyse firm entry decisions (see Berry (1992); Fuentelsaz and Gómez (1999) and Scott Morton (1999)).

markets were limited until recently (savings banks). At the same time, mergers among entities are likely to create some redundancies in branches. Therefore, it seems plausible to find that these competitors are moving overtime to new equilibrium positions. Once these specific features of the sector are taken into account in the explanation of the entry decisions of potential new entrants in one submarket, we expect these decisions will depend only on the submarket profit stream, irrespective of other firm-specific characteristics such as the entity's size.

To estimate the model, the components of the expected entity's profit are specified as a linear function of observed and unobserved characteristics given by

$$\Pi_{is}^{e} = \alpha + W_s\,\beta' + N_j\,\lambda' + X_i\,\gamma' + \varepsilon_{is} \qquad (2)$$

where X_i represents the vector of firm-specific characteristics, α, β, λ and γ are parameters to be estimated and ε_{is} is a disturbance term with a logistic cumulative distribution.

IV EMPIRICAL RESULTS

In this section, the determinants of entry decisions of the entities per submarket are estimated from the period 1994-98. The subset from the sample from the period 1994-98 consists of 1,523,065 (98.9 per cent of the total sample) observations in which entities are placed as potential new entrants. Restricting attention to these observations, 0.01 per cent of these represent entities that opened one branch in some year over the period.

The dependent variable is a dummy that takes the value 1 if entity opens one branch in town s in year t and 0 otherwise. The vectors of submarket characteristics (W_s, N_j) include the following set of variables: the size of the submarket *(Hab_s)*, population density *(D_s)*, an indicator of the level of per-capita disposable income *(Y_s)* and the level of rivalry in the submarket *(N_j)*. In modelling of the entry probability, I expect to find positive effects of the submarket size and level of income whereas negative effects of population density and the level of rivalry.

As I described in previous sections, the specific history of the Spanish retail banking sector affected the entry decisions of some entities. To take into account these specific facts in the entry probability, the following vector of firm-specific characteristics X_i is considered: a variable showing that the entity is a savings bank *($DSbank_i$)*, the local character of the entity *($Dlocal_i$)*, merger or acquisition process during 1988-1993 *($Dmer88_i$)* and during the

period 1994-98 *(Dmerge$_i$)*. *DSbank* are aimed at modelling the consequences of the different entry opportunities underwent between banks and savings banks over time. *Dlocal* attempts to control some cost advantages associated with the local or regional character of the entity. *Dmer88* and *Dmerge* are to capture if the increasing tendency of the industry to become concentrated has effects on the potential new entrants' decisions. Details on the variables are given in the Data Appendix.

Once these firm-specific characteristics are taken into account in the entry probability of potential new entrants, I do not expect any systematic advantage related to entity's size as the theoretical model suggests ("symmetry principle"). To test this hypothesis, the variable size of the entity *i (Size$_i$)* is introduced. This variable is measured by the number of branches owned per entity in the whole market.

Table 1 provides the results from a logit analysis of entry into a submarket. The coefficients for the set of explanatory variables are significant and show plausible signs.

Table 1: *The Entry Probability of Potential New Entrants into Submarkets*

DEPENDENT VARIABLE: Opening of one branch
Number of observations: 1,523,065

Variables	*LOGIT Coefficients*	*t-ratios*
Cte	–11.04	(–30.81)
Hab	0.30	(3.26)
D	–0.01	(–0.02)
Y	0.11	(1.85)
N_j	–0.31	(–2.83)
N_j^2	0.03	(4.92)
DSbank	1.16	(6.15)
Dlocal	–0.08	(–0.43)
Dmer88	0.17	(0.70)
Dmerge	0.28	(0.68)
Size	1.48	(10.92)
Log likelihood	–1248.24	
McFadden pseudo R^2	0.07	
% correctly predicted	76.00	

The set of submarket characteristics is found to be strongly associated with the entities' decisions to enter one branch in the submarket, as we

expected.[7] Looking at the firm-specific characteristics, savings banks show a tendency to expand in the small towns, as we expected. Moreover, all the entities, irrespective of the submarkets they cover (local, regional or national), have the same probability of opening branches in a submarket. Notice that if the entity underwent a merger process during the period 1994-98 or the period 1988-93, it will not affect to the entry probability. Perhaps, it is a bit early to observe the concentration effects of this industry over the potential new entrants' decisions.

Unfortunately, the results show that the largest entities are more likely to open branches in the submarket. This last result seems to be inconsistent with the "symmetry principle", as it seems to establish some systematic advantage related to entity's size. However, the impact of the size variable on the probability of average potential new entrants to open one branch during the four years is small. This average probability is 0.0049 per cent and the impact of the size variable on this probability is 18.38 per cent, whereas the impact of the set of submarkets characteristics are the following; 45.65 per cent the size of the submarket, 85.43 per cent the level of income, 100 per cent the level of rivalry in the submarket.

V CONCLUDING REMARKS

This work proposes to analyse the entity decision to open branches in a submarket and test if this decision is determined by what is happening in each submarket, irrespectively of what has happened in other submarkets, as the theoretical model suggests, with data on Spanish retail banking sector for the period 1994-98. To carry out the investigation, I have specified and estimated a discrete choice model to examine the entry probability of potential new entrants into submarkets.

The main empirical result is the following. Once the specific features of this retail banking sector are taken into account in the explanation of the entry decisions of potential bank entrants in one submarket, these decisions are mainly determined by the submarket characteristics more than by the bank-specific characteristics. This result is consistent with the assumptions of the Sutton's theoretical model, although this study does not find clear evidence of the consistency of the expected potential entrants' profit per submarket with the "symmetry principle".

[7] The importance of these characteristics in the firms' decisions is similar to the results reported in previous papers (see Bresnahan and Reiss (1991,1994); Berry (1992); Fuentelsaz and Gómez (1999) and Toivanen and Waterson (1999)).

DATA APPENDIX

To estimate the entry probability of potential new entrants per town, the dependent variable is a dummy that takes the value 1 if entity i opened one branch in town s the year t.

The vector W_s consists of the following variables:

Hab_s: *De jure* population of each town.
D_s: population density, measured by the number of inhabitants per square kilometer.
Y_s: dummy representatives of the different per-capita disposable income levels in each town.
N_j: number of branches owned by the competitors in the town, measured by the difference between the number of branches per town and the number of branches owned by each entity per town.

The vector X_i consists of the following variables:

$Size_i$: size of the entity, measured by the number of branches owned per entity in the whole market.
$DSbank_i$: dummy that takes the value 1 if the entity is a savings bank and 0 otherwise.
$Dlocal_i$: dummy representatives of the local character of the bank. It takes the value 1 if the entity covers mainly the region where it was created and 0 otherwise.
$Dmerge_i$: dummy that measures whether the entity underwent a merger or acquisition process during the period 1994-98. It takes the value 1 from the year in which the entity was merged and 0 otherwise.
$Dmer88_i$: dummy that measures whether the entity underwent a merger or acquisition process during the period 1988-93. It takes the value 1 from the year in which the entity was merged during this period and 0 otherwise.

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