ASSESSING BANKING COMPETITION: AN APPLICATION TO THE SPANISH MARKET FOR (QUALITY-CHANGING) DEPOSITS

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Abstract

Taking the Spanish market for deposits as a case study we show the importance of properly controlling for the quality of the services provided when assessing the degree of banking competition. While a simple approach based on estimating the price elasticity of the residual supply of deposit funds faced by banks does not reveal any increase in competition, such an increase is clear when the interest rate on deposits is "corrected" according to the behaviour of variables that proxy the quality of the different services embedded in a bank deposit.

JEL: G21, D40.

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1 Introduction

Although it is a highly relevant economic concept, the degree of competition is not a magnitude easy to be measured. The difficulties involved in quantifying competition are even bigger regarding the banking industry as shown in the related literature, where a number of alternative approaches can be identified.[1] The first and perhaps the most traditional approach comes from the field of industrial organisation and relies on the so-called structure-conduct-performance paradigm. The structure of the market (degree of concentration) determines banks pricing behaviour, which determines banks profits [see, among many others, Berger and Hannan (1989) or Hannan (1991)]. Changes in concentration and banks' profits, therefore, provide the clue for changes in competition. The difficulties with this approach have been extensively voiced [see, for instance, Schmalensee (1989)] and include from the problems to properly compute economic – as opposed to purely accounting – profits to the possibility of an alternative theoretical setup that predicts the same positive relationship between concentration and profits as a consequence of more, not less, competition. Thus, in a highly competitive market the most efficient banks will obtain higher profits and, consequently, will progressively gain market share ousting the least efficient competitors.

A second approach, which allows overcoming most of the difficulties with the previous one, is based on exploiting the different relationship between prices and costs under perfect competition and under alternative competition setups. Three main statistics are worth mentioning in this respect: the Lerner index, the so-called λ-statistic proposed by Bresnahan (1982) and Lau (1982) and the H-statistic proposed by Panzar and Rose (1987). All three are based on the theoretical result that under perfect competition prices have to be equal to marginal costs. Thus, the higher the deviation from this rule, the higher the market power of banks.[2] While broadly used in the literature [among others, Shafer (1993), De Bandt and Davis (2000), Bikker and Haaf (2002b), Toolsema (2002), Angelini and Cetorelli (2003), and Fernández de Guevara et al. (2005)], this approach is not without difficulties, the main one being that a cost function has to be estimated and therefore, a precise identification of the inputs and outputs of these very peculiar multiple-product firms has to be made.

A third approach can be mentioned, which relies on the estimate of the elasticity of the residual demand faced by each individual bank. This is the approach followed, for instance, in Amel and Hannan (1999), where the basic idea is that under perfect competition banks face perfectly elastic demands for their products while some degree of inelasticity prevails in market setups where banks retain some form of market power.[3] Compared to the previous approach, this one has the advantage that it does not require the identification of the multiple inputs and outputs in the banking industry production function.

The three approaches above, however, share other difficulties to properly assess the degree of banking competition that have not been paid too much attention in the empirical applications. The first one relates to the problem of identifying the relevant market where the

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1. For two recent surveys, see Bikker and Haaf (2002a) and Northcott (2004).

2. Other papers have analysed the pass-through from interbank interest rates to bank loan and deposit rates to assess the degree of competition [see, for instance, Lagos and Salas (2005) for the Spanish case]. This approach can be seen as a particular case of the most general one in Panzar and Rose (1987), where the emphasis is put on one of the most relevant inputs in the banking intermediation process: interbank deposits.

3. In a related vein, see Gondat-Larralde and Nier (2004).

analysis makes sense. This refers mainly – although not exclusively – to the identification of a "bank product". Thus, for instance, bank loans are far from being a homogeneous product as a consequence of different borrower qualities.[4] But even after having identifying the product or the market, it still remains the problem of controlling for changes in non-price characteristics of the service provided. Interestingly, there is an ample literature on the computation of hedonic prices for goods, where changes in good quality are properly distinguished from pure price changes [see, for instance, Berndt et al. (1995)]. Nevertheless, despite the well-known high degree of innovation and technological sophistication witnessed in the financial service industry, it is not usual that financial prices – or interest rates – are corrected in the same way. This may be particularly relevant when assessing banking competition as banks seem to provide today a broader range of services under the same "product labels", i. e. deposits, loans, etc.

Against this background, the objective of this paper is to assess recent changes in competition in the Spanish market for bank deposits, taking into account the above considerations. Thus, compared to previous works, we use the third (least common) approach mentioned before and stress the implications of explicitly taking into account some relevant changes in the quality of the services provided by banks through their products. The stress on the changes in the quality of the different services embedded in each bank standard product relates our paper to the literature on the so-called non-price competition in banking [see Pinho (2000), Kim and Vale (2001) or, for the Spanish case, Carbó et al. (2005)]. We have chosen the residual demand approach also because, as will be shown, it allows for the quality correction to be included in a rather simple way.

Regarding the identification of the bank products, we have limited our analysis to the deposit market because loans are, in our view, too far from being a homogeneous enough product class. Available data, moreover, force us to consider the whole national market. As mentioned, this implies some limitations that, however, are probably becoming progressively less relevant.

As to our choice of the Spanish case, it allows us exploiting a rich database containing individual bank data that, at the same time, provide us with an interesting case study. Thus, the Spanish market for bank deposits has witnessed a recent, but very quick, process of deregulation and market liberalisation [see Salas and Saurina (2003)] which has coincided with a parallel process of notable consolidation in the banking industry. These two forces – which are also at play in many other countries – are likely to push in opposite directions and the net effect is not clear. They have also encouraged a remarkable process of innovation and technological improvement that is likely to have rendered service quality changes particularly relevant. It may be worth noting too an apparent contradiction between the views held by practitioners and regulators on the effects of these changes. While the former have frequently claimed that competition in this market is fierce and growing, the results of most empirical papers failed to find such an increase in competition [e. g., Carbó et al. (2003), Martín-Oliver et al. (2005), Maudos and Fernández de Guevara (2004), and Maudos and Pérez (2003)]. Carbó et al. (2005), however, find an increase in competition in the deposit market, although they still find a decrease in competition in the loan market.

4. The concept of market can also have a geographical dimension. It has to be mentioned, however, that changes in regulation and financial innovation materialised, for instance, in new distribution channels are likely to make this issue progressively less relevant.

According to our results, properly considering the behaviour of variables like the number of branches, a proxy for the "proximity" service embedded in a bank deposit, proves to be crucial regarding the conclusions to be drawn on the changes in banking competition in Spain. When movements in these variables, which capture changes in the quality of the service provided by the banks under the label "bank deposit", are taken into account, there is clear evidence in favour of an increase in competition in the Spanish bank deposit market in the last years. When competition is instead assessed exclusively on the way gross interest rates behave, the opposite conclusion is mistakenly drawn.

The rest of the paper is structured as follows. First, we present a simple setup to provide a theoretical support to our empirical approach. Next we briefly describe the data we use and show our main empirical results. Some concluding remarks close, finally, the paper.

2 A (simple) setup and our empirical strategy

As in Amel and Hannan (1999), our approach to assess the degree of competition in the Spanish market for deposits relies on the well-known fact that under perfect competition firms face a perfectly elastic demand for their products at the price level determined by the matching between the market demand and the market supply for that product. On the contrary, if they retain some degree of market power, the elasticity of the demand they actually face is less than perfect. It is worth noting, however, that because we deal with the banking deposit market – where an interest rate plays the role of "price" – and in order to work with standard positive-slope supplies, we follow here the convention that households and non-financial firms supply deposit funds, which banks demand. Thus, we start by assuming there is a single good called "deposit funds" for which there is a standard "Marshallian" market supply function

$$(1)\quad D_t = S\ (r_t,\ Z_t)\ ,$$

where D stands for the amount of deposit funds – for the sake of simplicity we will call it deposits in the rest of the paper – r stands for the (market) interest rate on deposits, Z summarises all remaining deposit supply determinants and the sub-index t refers to time. We then distinguish expression (1) from the "residual" deposit supply function for individual bank i, defined as

$$(2)\quad D_{it} = S_i(r_{it},\ r_t,\ Z_t)\ .$$

The derivative of the residual supply function with respect to the interest rate on deposits set by bank i allows us to distinguish between perfect competition (where the derivative is equal to infinity), monopsony (where it coincides with the slope of the Marshallian supply function) and intermediate situations (where the derivative is somewhere between those extreme values). Leaving aside its level, changes in the derivative along time also inform about changes in the degree of competition: the higher the derivative, the lower the market power of banks.

Thus, we can assume a log-linear approach to equation (2) and specify

$$(3)\quad \log D_{it} = \alpha_{0i} + \alpha_{1i} r_{it} + ZZ_t\beta + \varepsilon_{it}\ ,$$

where ZZ includes the variables in Z as well as the market interest rate. By estimating equation (3) for different periods we can draw conclusions on the way competition has changed in this market.

Nevertheless, as commented above, proceeding that way would imply assuming that the quality of the services provided by a deposit cannot change. This is rather a strong assumption as, for instance, depositors had in 2003 much more branches or ATMs where they could withdraw their money. Telephone or internet access to the funds is just another example of the bundle of services encompassed under the label "deposit". While some of these "perks" could be directly charged through fees, it is quite more common, at least in Spain, to allow the corresponding costs to be reflected in the interest rate paid on deposits. Thus, we propose to replace r in equations (1) and (2) by a new variable reflecting

"total return" on deposits which, in time, would be a function of the interest rate paid and the complementary services provided (per deposit unit) x:

$$(1')\ D_t = S\left[(f(r_t, x_t), Z_t)\right]$$

$$(2')\ D_{it} = S_i\left[f(r_{it}, x_{it}),\ f(r_t, x_t), Z_t\right]$$

As in Amel and Hannan (1999), we also consider the possibility of a partial adjustment to equilibrium to allow for possible switching costs in moving from one bank to another. In particular, we assume that the amounts actually observed at t are a convex combination between the optimal ones – that is, deposits satisfying equations (1') and (2') – and those observed a period before.

Accordingly, our empirical equation to assess changes in the degree of competition in the Spanish market for (quality-changing) deposits is as follows:

$$(4)\ \log D_{it} = \phi \log D_{it-1} + \alpha_{0i} + \alpha_1 (r_{it} + X_{it}\alpha_2) + \beta_t + \varepsilon_{it},$$

where we have considered that banks are symmetric regarding competition, apart from possible bank-specific individual features included in the constant α_{0i}. X is a set of variables that proxy for changes in the quality of deposits, which will be detailed later on. Also, all time dependent variables which do not vary from bank to bank (that is, the Z set and the market interest rate) have been aggregated in a time dummy, as we are not particularly interested in distinguishing the effects of these components. This time dummy captures, therefore, the effect of variables like, among others, the return on alternative financial assets. It is worth noting that by testing whether α_2 is equal to zero we can directly test the relevance of controlling for changes in the quality of deposits when assessing the way competition has changed.

3 The data

We have information for all Spanish depositary institutions (around 300) along the period 1988-2003. Our source is the information that banks provide regularly to the Bank of Spain, who is their supervisory authority, but most of the data that we finally use in this paper could be obtained from the annual reports released by the own institutions. Thus, for instance, although our available frequency varies between different pieces of information, we finally opted for using annual data. Deposit balances, branches, cash dispensers and other balance sheet variables are computed at the end of each year, while interest rates have been computed in average terms – concretely, we consider the average level corresponding to the last quarter of each year.

Regarding deposit balances, we have information on sight deposits, redeemable deposits (currently, very much like sight deposits, but still less remunerated) and term deposits. With respect to interest rates, we also have two alternative sources of information. On one hand, banks declare average interest rates on all new operations[5]. On the other, combining data from the profit and loss account (interests paid) with average balances it is possible to obtain implicit average interest rates for all outstanding deposits.

Since we are interested in the retail deposit market, we have eliminated from our sample those banks mainly focused on other business. In particular, we have applied several filters to the data, based on the proportion of foreign currency deposits, average size of deposits, deposits over total assets and volatility of deposit balances and average sizes. We have also eliminated observations corresponding to banks with less than 5 million euros in sight deposits or less than 10 million euros in total deposits. Finally, we have dropped the observations corresponding to institutions involved in mergers or acquisitions of other banks[6].

The resulting filtered database contains somewhat more than two thousand observations, corresponding to an incomplete panel with between 127 and 157 banks during 15 years (1989-2003). It is worth noting that this sample accounts for 80% of total sight deposits and 83% of total domestic non-interbank deposits, thus being highly representative of the market under analysis.

In the period under consideration, the Spanish market underwent some very significant developments, to a great extent shared with other national markets. Thus, for example, the process of liberalization and deregulation continued, inflation and interest rates declined considerably in the run-up to EMU participation and new competitive forces appeared with the extraordinary development of mutual funds and the launch of Internet-only banks. A priori, all these elements should have had substantial implications for the competitive conditions in the market.

In fact, Chart 1 shows a marked reduction in banks' liability margins, especially for low interest bearing deposits. However, since competition unfolded in step with declining interest rates, it is difficult to determine the part of the resulting compression of margins that

5. In an effort to harmonize data across euro area countries, in 2003, the requirements of information on interest rates applied by banks changed significantly, making very difficult to reconstruct homogeneous historical series in many cases.

6. After a merger or acquisition of a minimum size, we characterise the resulting bank as a new entity.

comes from growing competition and the one that comes from the existence of a floor for the remuneration of transactional deposits. Moreover, since the past 15 years also witnessed a reduction in the number of banks (see first panel of Chart 1) and an increase in market concentration, it is theoretically possible to argue that competition is not so strong now[7]. The implications of these changes are extremely important for the future, since a conclusion that the bulk of the liability margin compression comes from declining interest rate would lead to infer its recovery when market rates rebound. Our results point, however, that this would be constrained by competitive forces.

Chart 1 also shows how median annual commissions on transactional accounts increased significantly in the first part of our sample, as banks tried to offset higher liability costs by making customers pay more for different services. Later on, commissions levelled off and even trended slowly downward since 1996. Accordingly, when assessing how competition has changed in this market it seems important to distinguish between gross interest rate on deposits and their net value when the commissions paid are deducted. It is worth noting that some of these commissions are a lump-sum charge whereas another part are directly linked to some services provided (transfers, for instance).

It is also worth noting that Spanish banks have continued to develop an extensive network of branches and ATMs to the point of having now more than 1,100 bank branches and 1,500 cash dispensers per million of inhabitants. Thus, proximity seems to be a significant component of any bank product and, as a consequence, it can be a relevant factor when analysing competition in the supply of bank deposits in Spain.

7. Indeed, this was the contention of some of the papers, about the Spanish banking market, mentioned in the Introduction.

4 Empirical results

To estimate equation (4) we make use of data on sight deposits for each bank in the national market (that is, balances recorded in branches located in Spain). Sight deposits are presumably the most homogeneous product, since they are not affected by differences in the terms to maturity of deposits. It is worth noting too that this turns out to be the market in which Internet-only banks have gained more market share over the past years.

As to the interest rate, we use the average interest rate declared by each institution for all new remunerated operations. This does not include those transactional deposits with a very low, or even null, remuneration. But we think this is the more relevant rate, since it is the marginal rate faced by a representative depositor who looks for the best deal in the market. This option, however, implies excluding from the sample credit cooperatives, since they did not report average interest rates on new operations before 2003. They represent less than 5% of the deposit market.

In any case, we check later on the robustness of the results obtained in this case by considering both total deposits and the implicit average interest rate, which takes into account both remunerated and non-remunerated sight deposits.

Since we are particularly interested in analysing changes in the degree of market competition over time, we split the sample in three 5-year periods (1989-1993, 1994-1998 and 1999-2003) and allow the relevant coefficients to vary among them. It is important to note that this is just a pragmatic approach to assess the time changes in competition. Although 1994 and, particularly, 1999 could be relevant dates from the standpoint of the recent development of the Spanish economy, our only motivation here is to split the sample period looking for a balance between the number of sub-periods and its length.[8]

Column 1 in Table 1 presents the main results of the starting point of our empirical analysis. If we consider the interest rate on deposits as the only relevant price variable in equation (4) – that is, we impose $\alpha_2 = 0$ – the estimated supply function is, as expected, positively sloped. But the interactions between the interest rate variable *(rsdn)* and the two step dummies *(D94* and *D99)* used to divide the sample into three subsequent periods are not statistically significant. As the slope of the banks' deposit residual supply function does not seem to have changed during the period considered, we obtain the usual result in the related literature that competition has not increased in a significant manner in Spain. Note also that standard goodness-of-fit tests are comfortably passed as shown at the bottom of the column. The same applies to the remaining columns in the table.

As a first extension, in the second column of the table we show the results of moving from gross interest rates to interest rates net of the commissions paid by depositors. Thus, we include as the first component of matrix X in equation 4 the variable *fees*, which measures these costs as a percentage of deposits.[9] As commissions include some fixed costs of keeping a deposit as well as the cost of some specific services provided (as, for instance, transfers made from the deposit account, when allowed) we decided to consider first this component isolated from the remaining variables in X. As can be seen, the

8. Nothing substantial changes if we split the sample into two sub-periods instead.
9. We therefore do not take logs in this case.

estimated coefficients[10] are negative as expected and point toward a statistically significant effect since 1994. Nevertheless, the result in column 1 that competition does not seem to have increased since the beginning of our sample keeps.

The third column in Table 1 shows the results of our preferred specification, where all the components of X are included in the regression. Thus, in addition to *fees* we include the (log of the) number of branches *(nofi),* the number of ATMs per branch *(atmr)* and the ratio of bank capital to total assets *(kr).* The first variable is aimed at capturing the proximity services embedded in a bank deposit. If depositors value proximity, they will be willing to accept a lower remuneration in exchange of a higher number of branches that reduce the "travelling" costs of withdrawing money from their accounts. In a similar vein, a cash dispenser allows depositors to withdraw funds out of the business hours. To avoid the consequences of the collinearity between branches and ATMs and to better capture the genuine effect of the later, we have included as a regressor its ratio to the number of branches. As to the degree of capitalisation, the rationale here is to include a variable that captures how risky a bank is. In principle, depositors should ask for a higher remuneration when deposits are made with a riskier bank. It is worth noting, however, that in Spain deposits are secured to a certain limit (currently, twenty thousand euros per bank and depositor), what potentially reduces the relevance of this mechanism. To overcome the simultaneity between its denominator and the dependent variable in the regressions, we lag the variable *kr*.[11] [12]

The new variables included in the third column of the Table are positively signed as predicted. The number of branches is clearly significant, while the significance is only marginal in the other two cases. But the most important result of this column refers to the coefficient estimates for the interest rate. Now, we find a statistically significant increase in the slope of the supply function at the end of the sample. It is moreover quantitatively important: the slope multiplies by 3 between the first and the last subperiod in our sample. As shown in the last column of the table, this result does not change if the variables *atmr* and *kr*, which are only marginally significant as commented, are dropped from the regression.

It could be argued that the OLS estimates of α_1 in Table 1 could be downward biased as a consequence of the possible endogeneity of the interest rate. It is important, however, to note that the bias would affect the estimates of α_1 but not the estimates of the changes in α_1, which are the estimates we are interested in to test whether competition has actually increased. But it is worth adding too that the bias is unlikely to be too sizeable in this context, as we are estimating residual supply functions for individual banks where we have controlled for different measures of the quality of the services associated to the deposit, for any possible bank-specific fixed effect, as well as for aggregate temporal effects common to all banks. Table 2, where the results of standard exogeneity tests are shown, tends to confirm this hypothesis.[13]

To additionally check the robustness of our empirical finding that competition does actually seem to have increased in the bank deposits market, we replicate in table 3 the

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10. As we are just interested in changes in α_1, we are implicitly allowing α_2 to freely change between periods in our estimates and freely estimate the product of both coefficients.

11. The last two variables are ratios and therefore are included in levels, not in logs.

12. We have considered also other variables that can be interpreted as additional measures of the quality of the services provided with a deposit (e. g., employees per branch, technological and marketing expenses, etc.) but they were generally non-significant and did not affect the results reported.

13. Since there is no residual correlation in our estimated equations, we have used the first lag of the interest rate as the instrument in the test.

regressions in columns 1 and 3 in table 1 considering, first, the average remuneration of outstanding – instead of just new – sight deposits. And second, we replace sight deposits by total deposits (sight, redeemable and term deposits).[14] As can be seen, when the average remuneration is considered, the equation where the variable *fees*, *nofi*, *atmr* and *kr* are ignored does not detect a significant change in the interest rate elasticity of the deposit supply function. Nevertheless, when they are included, the conclusion changes drastically as the slope increases in a statistically significant manner. This increase is also marginally apparent in column 3, where total deposits are considered. But it is much more evident in column 4, where the four quality variables have been added and where the slope of the supply function multiplies by more than 8.[15]

14. Total deposits are the sum of sight, redeemable and term deposits. As relevant deposit rates in this case, we first calculate the spread between the bank's rate and the median rate applied to deposits of type j at time t. That is, for each type of deposit and time period, we calculate the premium (or discount) the bank is applying to its customers, compared to the market as a whole. Then, for each bank, we obtain a weighted average of those premiums/discounts, where the weights are given by the bank's balances of each kind of deposit.

15. We have also considered the term deposits market. As for total deposits, the increase in competition is significant even without controlling for the quality variables, but the increase is higher when these variables are included. It has to be mentioned, however, that term deposits are quite less homogeneous than sight deposits.

5 Conclusions

There is a growing consensus that competition, within the limits imposed by a proper prudential supervision framework, is a guarantee of financial market efficiency. But competition is an elusive magnitude. In this paper we have stressed, taken the Spanish case as an illustrative case study, the importance of properly taking into account the effects of changes in the quality of the financial services provided when assessing the way competition is changing in a financial market.

In particular, we have exploited a rich database on Spanish individual banks from 1989 to 2003 to estimate the elasticity of the residual deposit supply functions faced by the banks. In our view, this approach offers a valuable way out of the problems posed by other more standard approaches to assess changes in competition, and is particularly useful when prices have to be corrected for quality considerations.

According to our results, when the return on deposits is considered the only relevant variable for competition, we are not able to find any significant change in the degree of competition in the bank deposit market. However, when variables like the number of branches, the number of ATMs or the degree of bank capitalisation are explicitly incorporated, we find an important increase in the price elasticity of the residual supply functions, which implies that competition has actually increased between 1989 and 2003.

We think these variables proxy some quality components of a deposit like its spatial proximity, its time availability or the risks faced by the depositor. The relevance of quality controls in price analysis in markets for goods has been emphasised by a rich literature on the computation of the so called hedonic prices. We think, and our results seem to confirm our thoughts, that these controls can be even more important in financial asset pricing analysis.

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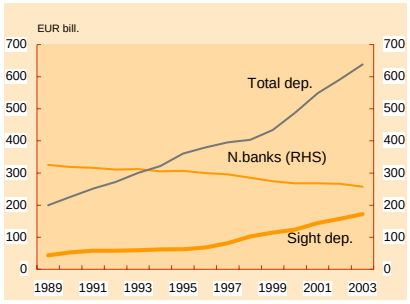
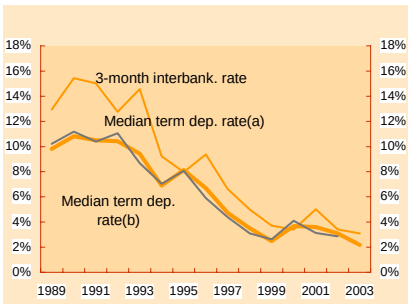
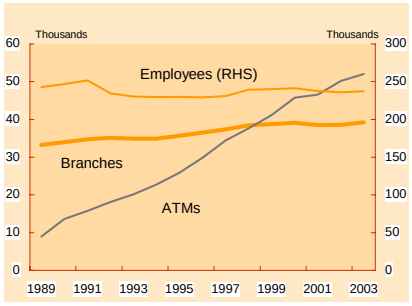
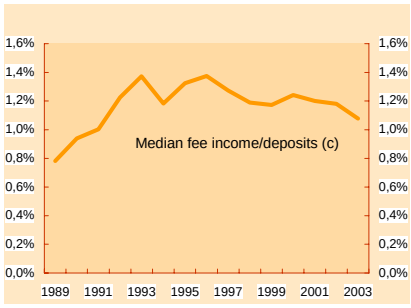
CHART 1

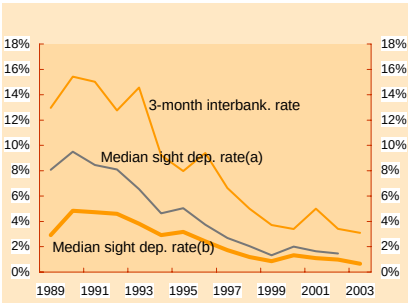
BEHAVIOUR OF THE MAIN VARIABLES IN THE SPANISH DEPOSIT MARKET

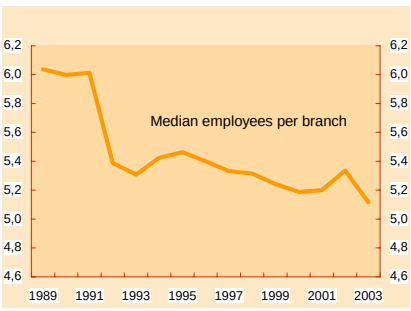


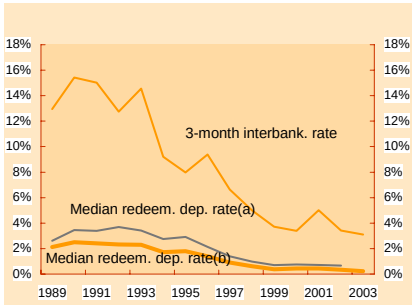


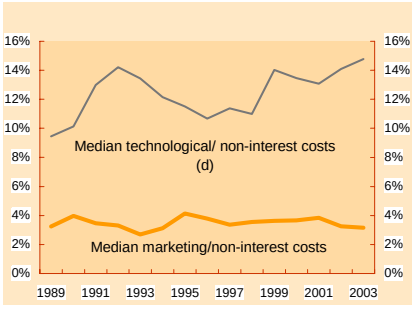












(a) Average interest rate on new remunerated operations.
(b) Implicit interest rate (interest paid/average balance).
(c) Fees and commissions' income from payments, transfers and other related concepts / sum of sight and redeemable deposits.
(d) It includes IT, communications and outsourced costs.

TABLE 1

ESTIMATED BANK DEPOSITS' SUPPLY FUNCTION IN THE SPANISH MARKET
Dependent variable: Log(sdep) (a)(b)

	(1)	(2)	(3)	(4)
Log(sdep$_{t-1}$)	0.774 ***	0.769 ***	0.710 ***	0.702 ***
	(24.49)	*(22.81)*	*(22.18)*	*(21.71)*
rsdn	1.435 ***	1.199 **	1.657 ***	1.715 ***
	(3.10)	*(2.55)*	*(3.63)*	*(3.79)*
rsdn*D94	-0.729	-0.599	-0.400	-0.670
	(-1.06)	*(-0.87)*	*(-0.59)*	*(-0.99)*
rsdn*D99	1.750	1.770	3.239 **	3.297 **
	(1.21)	*(1.23)*	*(2.33)*	*(2.28)*
fees		-0.011	-1.444	-1.338
		(-0.01)	*(-1.44)*	*(-1.38)*
fees*D94		-2.127 **	-2.806 ***	-2.753 ***
		(-2.55)	*(-3.07)*	*(-3.44)*
fees*D99		0.021	-1.218	-0.882
		(0.02)	*(-1.43)*	*(-1.09)*
Log(nofi)			0.259 ***	0.248 ***
			(6.05)	*(5.70)*
Log(nofi)*D94			0.004	0.008
			(0.41)	*(0.90)*
Log(nofi)*D99			0.016	0.012
			(1.63)	*(1.33)*
atmr			0.050	
			(1.52)	
atmr*D94			0.002	
			(0.06)	
atmr*D99			-0.038	
			(-1.36)	
kr$_{t-1}$			0.707	
			(1.42)	
kr$_{t-1}$*D94			0.145	
			(0.31)	
kr$_{t-1}$*D99			0.393	
			(0.78)	
	Statistics			
Number of observations	1402	1392	1378	1392
R2	0.992	0.992	0.993	0.993
Root MSE	0.140	0.140	0.132	0.133
Arellano-Bond test for AR(1)	-0.25	-0.21	-0.28	-0.04
(p-value)	*(0.80)*	*(0.84)*	*(0.78)*	*(0.97)*
Arellano-Bond test for AR(2)	-1.45	-1.35	-0.96	-1.06
(p-value)	*(0.15)*	*(0.18)*	*(0.33)*	*(0.29)*

(a) OLS estimates which include non-reported time and individual bank dummies. T-ratio in parentheses. *,** and *** means estimates are statistically significant at the 10%, 5% and 1% confidence level, respectively.
(b) Variable definitions:
sdep= Sight deposits
rsdn= Average interest rate on new remunerated sight deposits
fees= Fees and commissions' income from payments, transfers and other related concepts / sum of sight and redeemable dep.
nofi= Number of branches
atmr= Number of cash dispensers/ number of branches
kr= Capital/Total assets
DXX: Dummy variable that takes the value 1 from 19XX onwards.

TABLE 2

EXOGENEITY TESTS FOR THE INTEREST RATE (a)

	(1)	(2)
Wu-Hausman F test:	1.77	0.18
(p-value)	*(0.18)*	*(0.67)*
Durbin-Wu-Hausman chi-sq test:	2.04	0.21
(p-value)	*(0.15)*	*(0.64)*

(a) Using the first lag of the interest rate as instruments.

(1) Model with the interest rate and the lag of the endogenous variables as regressors.

(2) Model including also other characteristics (nofi, atmr, kr) as regressors.

TABLE 3

ESTIMATED BANK DEPOSITS' SUPPLY FUNCTION IN THE SPANISH MARKET
Robustness tests. Dependent variable: Log(dep) (a)(b)

	Average rate on outstanding deposits		Total deposits	
	(1)	(2)	(3)	(4)
Log(dep_{t-1})	0.754 ***	0.687 ***	0.911 ***	0.876 ***
	(30,81)	*(27.66)*	*(47.44)*	*(39.81)*
r	4.123 ***	4.217 ***	1.586 **	1.251 *
	(7.02)	*(6.80)*	*(2.36)*	*(1.84)*
r*D94	-0.386	-0.405	2.679 *	3.457 **
	(-0.42)	*(-0.44)*	*(1.84)*	*(2.44)*
r*D99	3.040	5.698 ***	4.345 *	5.684 **
	(1.51)	*(2.69)*	*(1.72)*	*(2.30)*
fees		-0.133		0.956
		(-0.16)		*(1.48)*
fees*D94		-2.687 ***		-2.058 ***
		(-3.43)		*(-3.99)*
fees*D99		1.231 *		1.350 **
		(1.74)		*(2.27)*
Log(nofi)		0.224 ***		0.105 ***
		(7.67)		*(6.05)*
Log(nofi)*D94		0.003		0.007 *
		(0.45)		*(1.79)*
Log(nofi)*D99		0.011 *		-0.002
		(1.91)		*(-0.76)*
atmr		0.042 *		0.077 ***
		(1.77)		*(5.42)*
atmr*D94		-0.028		-0.056 ***
		(-1.17)		*(-4.33)*
atmr*D99		-0.017		0.001
		(-0.96)		*(0.07)*
kr_{t-1}		0.400		0.727 ***
		(0.98)		*(3.45)*
kr_{t-1}*D94		-0.105		-0.219
		(-0.28)		*(-1.06)*
kr_{t-1}*D99		0.202		-0.144
		(0.56)		*(-0.82)*
	Statistics			
Number of observations	2204	2172	2584	2566
R2	0.994	0.994	0.998	0.998
Root MSE	0.135	0.129	0.088	0.085
Arellano-Bond test for AR(1)	0.03	0.18	0.42	0.41
(p-value)	*(0.97)*	*(0.85)*	*(0.67)*	*(0.68)*
Arellano-Bond test for AR(2)	-0.91	0.00	0.12	0.38
(p-value)	*(0.36)*	*(1.00)*	*(0.90)*	*(0.70)*

(a) OLS estimates which include non-reported time and individual bank dummies. T-ratio in parentheses. *,** and *** means estimates are statistically significant at the 10%, 5% and 1% confidence level, respectively.
(b) Variable definitions:
dep= Sight (mods 1 and 2) or total (3 and 4) deposits
r= Implicit interest rate on outstanding remunerated sight deposits (mods 1 and 2) or average rate on new deposits (3 and 4)
fees= Fees and commissions' income from payments, transfers and other related concepts / sum of sight and redeemable dep.
nofi= Number of branches
atmr= Number of cash dispensers/ number of branches
kr= Capital/Total assets
DXX: Dummy variable that takes the value 1 from 19XX onwards.

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