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Location and geographic diversification patterns of Spanish financial institutions:

Implications for growth, 1992–2009^{*}

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Abstract

Over the last twenty years, the Spanish banking industry has been deeply reshaped in several respects. One of the features that has allowed for it has been the geographic expansion of most savings banks, which have been expanding geographically into other regions (different from their regions of origin) at a remarkable pace since 1989. Almost simultaneously, the Spanish economy has grown at remarkable annual rates, a growth pattern which has come to an abrupt halt in 2008. Under these circumstances, this paper has several goals. The first one consists of exploring which the geographic diversification patterns of Spanish financial institutions have been during 1989–2009. This goal extends previous analyses in two main ways: (i) we include not only commercial and savings banks but also credit unions, which are very important in rural communities affected by financial exclusion; (ii) we evaluate location patterns from a spatial statistics perspective, whose importance in regional science has been demonstrated, but have not been considered for analyzing financial institutions' location patterns. There is a large body of literature analyzing the links between financial development and growth from a country or even regional perspective. In this article, the database we use enables the possibility of extending this goal to the municipal case. This is important, since there are some Spanish provinces such as Madrid with population above 6 million whose comparison with other much smaller provinces (whose population is well below 100,000 inhabitants) is rather uninformative. Results indicate: (i) the location and diversification patterns vary mostly across firms and by type of firm; (iii) the evaluation of growth and financial development at municipal level indicates that some communities have experienced financial exclusion; (iii) it is difficult to establish a linear relationship to explain bank branch geographic diversification; .

Key words and phrases: bank, branches, municipality

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1. Introduction

Over the last few years, one of the phenomenon which has contributed most to reshaping the Spanish banking industry have been the geographic expansion policies adopted by many Spanish financial institutions in general, and savings banks in particular. These initiatives have already a long lasting history, and started intensely after the passing of the corresponding act in 1988 (Real Decreto 1582/1988), which allowed savings banks to expand nationwide. Twenty years later, the structure of the Spanish banking industry offers a very different aspect in which savings banks' share of total industry assets is quite close to that of commercial banks. The new territorial expansion policies adopted by many savings banks, which have entered markets different to those in which they had been operating before the passing of the 1988 act on branching, has been largely responsible for this new structure.

However, the current economic and financial crisis, which is affecting especially many savings banks, largely because of their important role for financing the construction boom of the last few years, might be questioning their geographic expansion and diversification policies. The heterogeneity of geographic expansion decisions across financial institutions has been remarkable. However, it is difficult to evaluate with precision which the impact of the expansion policies has been unless we can evaluate which the expansion and location patterns have been when choosing the locations for new branches.

The literature that has been paying attention to aspects related to expansion and geographic diversification patterns of banking firms, despite the importance of the phenomenon, is still relatively limited, even though the variety of points of view that can offer the analysis is ample. This is partly related to the fact that the number of countries in which this type of experiences might have occurred is limited, to the point that we will only find a parallelism with the Spanish case in the U.S., where the passing of the Riegle-Neal Act in 1984 allowed banks to branch in different states to the state of origin of each bank. Given the importance of both the phenomenon and the U.S. banking industry itself, the literature analyzing different aspects related to the effects of the the Riegle-Neal Act is already voluminous. A brief review can be found

in Illueca *et al.* (2009).

In the Spanish case, despite the importance of the phenomenon and the impact that it might have had both on the entire economy and also on those financial institutions themselves which expanded geographically (and also on those which did not expand), the literature is still relatively scarce. Some studies have analyzed aspects related with entry and geographic diversification decisions (Fuentelsaz and Gómez, 2001; Fuentelsaz *et al.*, 2002), multimarket contact and strategic similarity in the context of entry decisions (Fuentelsaz and Gómez, 2006), or how the geographic expansion decisions may be related to the phenomenon of financial exclusion (Bernad *et al.*, 2008). The last line of research is related to some pernicious effects of deregulation, which might have encouraged some firms to abandon areas with relatively low per capita income levels. The studies by de Juan (2003, 2008) are more focused on applying industrial economics models of branching to the case of the Spanish banking system. In de Juan (2003) the predictions of Sutton's (1997) independent submarkets model are tested for the case of the Spanish retail banking market, whereas in de Juan (2008) the entry threshold concept developed by Bresnahan *et al.* (1987) is used to examine how competitive conditions varied in Spanish local banking markets in 2003.

Although the studies reviewed in the above paragraph have reached relevant results, which have contributed to an overall improvement in the knowledge of geographic diversification and entry in local banking markets, none of them has dealt with these issues from a point of view of geography and/or spatial statistics. However, the advantages of adopting these points of view can be remarkable, as demonstrated by the plethora of studies dealing with the analysis of economic activity in general (see, for instance Glaeser *et al.*, 1992; Henderson, 1997, among many others).

In our study, in which we aim to determine the spatial location patterns for Spanish bank branches, should be placed within this field of research. Given the already remarkable amount of studies regarding the location of economic activity for the Spanish case, our analysis would enable comparing the degree of spatial concentration of the Spanish banking system with the other economic sectors. This would allow to find the differences or similarities in the location patterns which would allow exploiting the scale economies generated by location.

2. Relaxation of the limits to expand geographically

The deregulatory initiatives referred to in the previous Section require a definition of what we understand by geographic expansion which, in turn, means that what might be labeled as the natural market must be defined. In accordance with Fuentelsaz and Gómez (1998), we may define a natural market as those provinces where the presence of the savings bank being analyzed allows it to carry out a retail banking activity, for which it must have had at least 5% of the total number of branches located in the province in the first period of the sample (1992). This concept enables us to define the varying expansion strategies that each firm might have followed. For instance, one particular savings bank may have chosen an “aggressive” geographic expansion by setting up branch offices in markets other than the natural one or, on the contrary, to follow a more “defensive” strategy, aimed at consolidating its position in its own market in view of potential entry by competitors. Expansion may have also been nationwide, through branching both in the natural market and in the new markets. These strategies have meant commercial banks, savings banks and credit unions have experienced very disparate paths in terms of number of branches, employees, or volume of assets, translated finally into gaining market share for both savings banks and credit unions to the detriment of commercial banks.

Therefore, following Fuentelsaz *et al.* (2004) and Illueca *et al.* (2009), we will distinguish three different strategies followed by banking firms:

Expansion in the natural market: variation in the number of branch offices in the natural market.

Expansion in other markets: variation in the number of branch offices in markets other than the natural markets.

Nationwide expansion: total variation in the number of branch offices across the country (natural market and other markets).

However, as indicated in Table 1, if we consider the evolution of the three types of banking institutions considered jointly, i.e., commercial banks, savings banks, and

credit unions, it is observed that the tendencies differ strongly. Overall, the total number of branches has increased steadily from 35,429 by 1992 to 44,085 by 2009, which represents a 24.43% increase. The peak had been reached earlier (in 2008 the total number of branches was 45,662), but the deep international economic and financial crisis has impelled many firms to redefine their expansion strategies—and this tendency is expected to hold in the near future. In some years, the increase in the total number of branches has been stunning—for instance, between 2005 and 2007 the number of branches increased by 8.38%, which represents almost 4,000 more branches. In contrast, in some years the number of total branches has declined moderately—for instance, between 1992 and 1993, due to both the economic crisis and the mergers and acquisitions' process that was affecting savings banks, and also in the years of the dot-com crisis.

Taking into account the total number of branches for any of the three aggregates, it is apparent that lifting the restrictions to branching for those institutions that could not do it—savings banks and credit unions—has resulted in these types of firms to follow much different strategies to those of commercial banks. Indeed, the evolution for the aggregate (columns 1 and 2 in Table 1) is the result from very disparate trends for the different types of firms. In the case of savings banks, the number of branches has increased from 14,291 by 1992 to 24,202 by 2009, which represents a 69.35%. The increase would be even higher if we compare 1992 to 2008 (in this case the increase would be of 74.83%!). This has also led this type of firms to increase its share of branches (from 40.34% to 54.90% between 1992 and 2009). In the case of the credit unions, the rise has also been quite remarkable—from 3,080 to 5,043 branches, representing a 63.73% increase. However, the relative importance of this type of institutions is minor, since its share of branches is still limited (11.44%).

The trends for commercial banks have been opposite. As indicated in Table 1 (columns 3, 4 and 5), the number of branches has actually *decreased* from 18,058 to 14,840, representing a –17.82% decline. Most of the decline occurred in the first half of the sample period (between 1992 and 2001), which is the period when savings banks expanded more aggressively (increasing their total number of branches by 38.75%). In contrast, in the second half of the period the total number of branches actually

increased slightly (by 0.57%), although the rise would have been much higher had we excluded year 2009 (between 2001 and 2009 the increase was 5.58%). Therefore, although commercial banks and savings banks face the same regulatory regime (the remaining differences are almost entirely restricted to their type of ownership), the opposite branching strategies could suggest that differences are stronger than what one might *a priori* expect.

The last columns in Table 1 illustrate these differences more explicitly. The differences in the number of branches between commercial banks and savings banks have reversed entirely, from 3,767 to -9,362. However, this trend has reversed again in 2009, suggesting that savings banks might have to shut down more branches than commercial banks as a response to the new economic scenario emerging after the 2008 financial crisis—they might have gone too far in their geographic expansion policies, although this is a hypothesis that should be properly tested. An analogous pattern has emerged when comparing commercial banks and credit unions. Comparing savings banks and credit unions, the differences have also been favorable for savings—it has almost doubled.

Therefore, according to the information reported in Table 1, the expansion strategies for all commercial banks, savings banks and credit unions have differed sharply—especially comparing commercial banks with the other two groups of firms. However, there might have also existed differences *within* groups of firms. As indicated by Illueca *et al.* (2009), the rise in the total number of savings banks' branches between 1992 and 2004 was basically related to the expansion in other markets. However, it could also be corroborated that there were other strategies, as the number of branches that savings banks owned in their natural markets also increased sharply.

Following Illueca *et al.* (2009), these strategies could be defined as offensive (or aggressive) strategies and defensive strategies. They are clearly different, not only in their implementation but also in their objectives. Defensive strategies would be adopted by companies trying to strengthen their market share in their traditional markets. Offensive strategies are chosen by banks that try to increase their presence in a market in which, previous to 1989, they could not operate (Fuentelsaz and Gómez, 1998; Fuentelsaz *et al.*, 2004). This is specially the case of savings banks. These pat-

terns present multiple variations, for several firms adopted mixed strategies. This is the case of Caja Madrid, for example, which has strengthened both its position in its natural market (the autonomous region of Madrid) and in other markets, where it has expanded intensely.

3. The changing geography of the Spanish banking industry

The maps contained in Figure 1 through Figure 4 report graphical information on the geographic expansion of Spanish banking firms. Specifically, they contain information at provincial level (NUTS level 3 according to European Union notation) about the distribution of branches in Spain—not only in absolute terms (Figure 1) but also compared to the mean (Figure 3) or divided by population (Figure 4).

Figure 1a and Figure 1b corroborate the aggregate results found for commercial banks shown in Table 1—i.e., overall, the number of commercial banks' branches has *decreased*. However, the geographical distribution shows that the tendencies have differed for the different provinces, since in some of them the number of branches owned by commercial banks has decreased more sharply than in others. The only cases where the number of commercial banks' branches has actually risen between 1992 and 2008 are Madrid, Álava, Almería, Málaga, Las Palmas and Tenerife. In some of these cases the increase was virtually negligible (Álava and Tenerife), but in others it has been remarkable (Madrid).

In the case of savings banks the aggregate results (Table 1) are also corroborated. Analogously to the commercial banks' case, there are important differences across provinces, as shown in figures 1c and 1d. Although, on average, the number of savings banks' branches has not doubled, for several provinces it has been the case. The highest rise has occurred in Madrid, where the number of savings banks' branches has more than tripled (it was 969 by 1992 and 3,279 by 2008). In some other cases the increases have also been remarkable, especially in the south (Andalusia), east (Valencia and Murcia), north-east (Catalonia) and the islands (both Canary and Balearic). Although this is a hypothesis that needs to be properly tested, this are precisely the provinces where construction has boomed with more intensity. In contrast, the in-

creases have been more moderate in the north-west (Galicia), Navarre and the Basque Country, and Castille (both Castille-Leon and Castille-La Mancha).

Credit unions' patterns are much different, because of their specific characteristics. Although either banks or savings banks were initially present in all provinces, in the case of credit unions there were remarkable differences across provinces, mostly because they have been traditionally linked to some economic sectors (especially agriculture). Therefore, in some provinces, especially where these sectors were important, the number of branches has increased remarkably. However, for those provinces in which the importance of credit unions was minor, the number of credit unions' branches has increased moderately. This indicates that the branching strategies followed by these firms could have been *defensive*—indeed, there are some provinces in which their presence was important by 1992 but it is virtually the same by 2008, especially those in which the presence of either commercial banks or savings banks has increased moderately.

The information on Figure 1 does not take into account not only that there are important differences in the number of inhabitants in each province but also that the evolution has also been different (Hierro and Maza, 2009, 2010). Some provinces' population has increased sharply, either because of immigration of natives or foreign-born, whereas in others this has not occurred. This migratory flows could be partly responsible of the disparate branching patterns. Figure 3 shows that when taking this information into account the differences between 1992 and 2008 are more moderate. In addition, in the particular case of savings banks (Figure 3c and Figure 3d) there are some regions such as Valencia (east coast of Spain) where, despite of undergoing some of the most impressive increases in the number of savings banks' branches, the deviation from the mean is still negative.

4. On the determinants of bank branch expansion

According to the trends described in the above paragraphs, the heterogeneity across branching patterns and geographic expansion strategies has been remarkable. However, the dire circumstances that are affecting some Spanish financial institutions since

2008, especially savings banks, might suggest not all geographic expansion strategies have been successful. Although the causes should not probably be confined only to the territorial expansion policies, given that those firms involved in mergers and acquisitions' processes are almost exclusively savings banks, which are those institutions going through deeper difficulties, one may naturally wonder whether the decisions to branch were right.

We examine the covariates which determine the location decisions of banking firms. In Table 3 the dependent variable is the average increase (between 1997 and 2008) of total bank branches, whereas the independent variables are reflect to social, economic and financial indicators. The information used to run this regression is at municipal level (former NUTS level 5 in European terminology, or LAU level 2 according to the new terminology). The variables are introduced sequentially so we get better insights on their relative contribution to the model's fit. Some variables are not introduced jointly in order to avoid multicollinearity. The covariates also represent average rates of growth for the evaluated period, with the exception of *tourist_index* which is the value for 2008.

Results indicate that the main determinant of bank branches growth has been the growth of population. Although we do not have GDP information at municipal level, given the intense migration flows that have existed in Spain over the last decade (Hirero and Maza, 2009) we may assume this variable might be correlated with GDP at municipal level in case it existed. Splitting population between native and foreign-born, the (surprising) result is that the population growth of natives affects positively and significantly the increase of bank branches, but the relationship is not significant in the case of the foreign-born immigrants. However, we must admit there could be multicollinearity problems involved.

We include the unemployment rate in the set of economic covariates. Its effect is negative for some models, as expected, but its impact is never significant. We also include the evolution of the number of vehicles, separating them into both cars and trucks, given the latter are more related to the existence of industrial and/or construction activities. Other economic variables included are an indicator of industry and construction, an indicator of commercial activities (both retail and wholesale),

and a tourist index indicator. Among this variables, vehicles show a positive and significant impact; when they are split between cars and trucks, significance is lost, although this could be due to multicollinearity problems between both variables. Both the commercial retail and the tourist index also shows a positive impact, whereas the industrial and construction index shows a negative impact.

For all regressions in Table 3 the R^2 and \bar{R}^2 are quite low. This result is probably yielded by the relatively high number of zeros, due to the large number of small populations. Although those municipalities with less than 1,000 inhabitants are excluded, the number of municipalities with relatively low populations is still remarkable. For many of these municipalities the number of bank branches has not even changed over the period.

In Table 4, 5 and 6 we include similar regressions in which the dependent variable is the evolution of the number of commercial banks, savings banks, and credit unions, respectively. We include financial variables related to the presence of other types of financial institutions, which are always positive and significant. The fit of the regressions is still quite low.

We have also run the regressions at provincial level (see tables 7, 8, 9 and 10), in order to eliminate the problems with the zeros. Although the impact of some variables changes, in terms of both sign and significance (the latter would be probably related to the lower number of observations available), the magnitude of the R^2 rises remarkably, implying that our models largely explain the variation in the growth of the number of branches in each location.

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Table 1: Number of branches in the Spanish banking sector by type of institution (source: Bank of Spain and own elaboration)

Year	Total		Commercial banks			Savings banks			Credit unions			Difference commercial banks–savings banks			Difference commercial banks–credit unions			Difference savings banks–credit unions		
	Number	% change	Number	% change	Share	Number	% change	Share	Number	% change	Share	Number	% change	Share	Number	% change	Share	Number	% change	Share
1992	35429		18058		50.97	14291		40.34	3080		8.69	3767		10.63	14978		42.28	11211		31.64
1993	35193	−0.67	17636	−2.34	50.11	14485	1.36	41.16	3072	−0.26	8.73	3151	−3.69	8.95	14564	−2.08	41.38	11413	1.62	32.43
1994	35544	1.00	17557	−0.45	49.40	14880	2.73	41.86	3107	1.14	8.74	2677	−3.17	7.53	14450	−1.59	40.65	11773	1.59	33.12
1995	36251	1.99	17842	1.62	49.22	15214	2.24	41.97	3195	2.83	8.81	2628	−0.62	7.25	14647	−1.21	40.40	12019	−0.59	33.15
1996	37079	2.28	17674	−0.94	47.67	16094	5.78	43.40	3311	3.63	8.93	1580	−6.73	4.26	14363	−4.57	38.74	12783	2.15	34.48
1997	37634	1.50	17530	−0.81	46.58	16636	3.37	44.20	3468	4.74	9.22	894	−4.18	2.38	14062	−5.56	37.37	13168	−1.37	34.99
1998	38639	2.67	17450	−0.46	45.16	17582	5.69	45.50	3607	4.01	9.34	−132	−6.14	−0.34	13843	−4.46	35.83	13975	1.68	36.17
1999	38986	0.90	16905	−3.12	43.36	18337	4.29	47.03	3744	3.80	9.60	−1432	−7.42	−3.67	13161	−6.92	33.76	14593	0.50	37.43
2000	38967	−0.05	15811	−6.47	40.58	19268	5.08	49.45	3888	3.85	9.98	−3457	−11.55	−8.87	11923	−10.32	30.60	15380	1.23	39.47
2001	38676	−0.75	14756	−6.67	38.15	19829	2.91	51.27	4091	5.22	10.58	−5073	−9.58	−13.12	10665	−11.89	27.58	15738	−2.31	40.69
2002	38673	−0.01	14072	−4.64	36.39	20326	2.51	52.56	4275	4.50	11.05	−6254	−7.14	−16.17	9797	−9.13	25.33	16051	−1.99	41.50
2003	39405	1.89	14074	0.01	35.72	20871	2.68	52.97	4460	4.33	11.32	−6797	−2.67	−17.25	9614	−4.31	24.40	16411	−1.65	41.65
2004	40230	2.09	14168	0.67	35.22	21503	3.03	53.45	4559	2.22	11.33	−7335	−2.36	−18.23	9609	−1.55	23.89	16944	0.81	42.12
2005	41599	3.40	14533	2.58	34.94	22410	4.22	53.87	4656	2.13	11.19	−7877	−1.64	−18.94	9877	0.45	23.74	17754	2.09	42.68
2006	43286	4.06	15096	3.87	34.88	23418	4.50	54.10	4772	2.49	11.02	−8322	−0.62	−19.23	10324	1.38	23.85	18646	2.01	43.08
2007	45086	4.16	15542	2.95	34.47	24591	5.01	54.54	4953	3.79	10.99	−9049	−2.05	−20.07	10589	−0.84	23.49	19638	1.22	43.56
2008	45662	1.28	15580	0.24	34.12	24985	1.60	54.72	5097	2.91	11.16	−9405	−1.36	−20.60	10483	−2.66	22.96	19888	−1.31	43.55
2009	44085	−3.45	14840	−4.75	33.66	24202	−3.13	54.90	5043	−1.06	11.44	−9362	−1.62	−21.24	9797	−3.69	22.22	19159	−2.07	43.46
Change 1992–2001	3247	9.16	−3302	−18.29		5538	38.75		1011	32.82		−8840	−57.04		−4313	−51.11		4527	5.93	
Change 2001–2009	5409	13.99	84	0.57		4373	22.05		952	23.27		−4289	−21.48		−868	−22.70		3421	−1.22	
Change 1992–2009	8656	24.43	−3218	−17.82		9911	69.35		1963	63.73		−13129	−87.17		−5181	−81.55		7948	5.62	

Table 2: Main deregulatory initiatives in the Spanish banking sector (source: Bernad *et al.* (2008))

Year	Most relevant changes
1974	Freedom of banks to open branches nationwide More than two year loan and deposit rate free
1977	More than one year loan and deposit rates free Savings banks only: foreign exchange business permitted.
1978	Entry of foreign banks permitted (some restrictions apply in the retail segment)
1981	All assets' rates allowed to vary freely More than six months and 1 million peseta (approx. 6000€) Liabilities' side commissions free
1985	Savings banks allowed to set branches within their Autonomous regions Equalization of the investment coefficient for banks, savings banks, and credit unions
1987	All interest rates and commissions free
1989	Savings banks allowed to set branches nationwide

Table 3: Determinants of bank branch location, all banking firms, 1997–2008 (information at LAU level 2, formerly NUTS level 5)

[illegible]

Table 4: Determinants of bank branch location, commercial banks, 1997–2008 (information at LAU level 2, formerly NUTS level 5)

[illegible]

Table 5: Determinants of bank branch location, savings banks, 1997–2008 (information at LAU level 2, formerly NUTS level 5)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Coefficients										
(Intercept)	0.012*** (0.001)	0.017*** (0.002)	0.018*** (0.002)	0.014*** (0.004)	0.013*** (0.003)	0.015*** (0.003)	0.014*** (0.003)	0.015*** (0.003)	0.014*** (0.003)	0.015*** (0.003)
pop_inc	0.371*** (0.047)									
pop_spanish_inc		0.369*** (0.054)	0.368*** (0.054)	0.317*** (0.065)	0.278*** (0.066)	0.292*** (0.066)	0.286*** (0.067)	0.196*** (0.068)	0.195*** (0.068)	0.188*** (0.068)
pob_foreign		−0.012 (0.009)	−0.012 (0.009)	−0.013 (0.009)	−0.013 (0.009)	−0.013 (0.009)	−0.013 (0.009)	−0.009 (0.009)	−0.007 (0.009)	−0.007 (0.009)
unemploy			0.025 (0.040)	0.019 (0.041)	0.017 (0.041)	0.013 (0.040)	0.014 (0.041)	0.025 (0.040)	0.026 (0.040)	0.028 (0.040)
vehicles				0.079 (0.058)						
cars					0.136* (0.075)	0.114 (0.075)	0.113 (0.075)	0.115 (0.074)	0.126* (0.075)	0.134* (0.074)
trucks					−0.009 (0.075)	−0.002 (0.075)	−0.004 (0.075)	−0.020 (0.074)	−0.027 (0.074)	−0.036 (0.074)
ind_construc						−0.001*** (0.000)	−0.001*** (0.000)	−0.002*** (0.000)	−0.002*** (0.000)	−0.002*** (0.000)
comm_wholesale							0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
comm_retail								0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
tourist_index									0.000** (0.000)	0.000** (0.000)
bank_branches										0.013*** (0.005)
unions_branches										0.047*** (0.018)
Summaries										
R-squared	0.018	0.014	0.014	0.015	0.016	0.020	0.020	0.034	0.036	0.040
adj. R-squared	0.018	0.014	0.013	0.014	0.015	0.018	0.018	0.032	0.033	0.037
sigma	0.072	0.073	0.073	0.073	0.072	0.072	0.072	0.072	0.072	0.072
F	61.4	23.8	16.0	12.5	10.8	11.2	9.6	14.5	13.7	12.5
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Log-likelihood	4014.2	4007.5	4007.6	4008.6	4010.6	4017.0	4017.2	4041.1	4044.4	4051.3
Deviance	17.4	17.5	17.5	17.4	17.4	17.4	17.4	17.1	17.1	17.0
AIC	−8022.5	−8006.9	−8005.3	−8005.2	−8007.2	−8018.1	−8016.4	−8062.1	−8066.7	−8076.7
BIC	−8004.1	−7982.5	−7974.8	−7968.5	−7964.4	−7969.2	−7961.5	−8001.0	−7999.6	−7997.3
N	3324	3324	3324	3324	3324	3324	3324	3324	3324	3324

Table 6: Determinants of bank branch location, credit unions, 1997–2008 (information at LAU level 2, formerly NUTS level 5)

[illegible]

Table 7: Determinants of bank branch location, all banking firms, 1997–2008 (information at NUTS level 3)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Coefficients									
(Intercept)	0.005* (0.003)	0.016*** (0.005)	0.016*** (0.005)	0.008 (0.009)	0.009 (0.010)	0.003 (0.010)	0.002 (0.010)	0.002 (0.010)	−0.008 (0.009)
pop_inc	0.629*** (0.172)								
pop_spanish_inc		1.210*** (0.262)	1.069*** (0.270)	0.854** (0.335)	0.928** (0.360)	0.707* (0.376)	0.552 (0.371)	0.479 (0.394)	0.351 (0.334)
pob_foreign		−0.052* (0.029)	−0.038 (0.030)	−0.054 (0.033)	−0.035 (0.037)	−0.026 (0.037)	−0.014 (0.036)	−0.010 (0.037)	0.014 (0.032)
unemploy			0.150* (0.087)	0.106 (0.096)	0.121 (0.097)	0.136 (0.096)	0.182* (0.095)	0.190* (0.097)	0.225*** (0.082)
vehicles				0.241 (0.222)					
cars					0.036 (0.273)	0.101 (0.271)	−0.119 (0.282)	−0.159 (0.292)	0.145 (0.257)
trucks					0.134 (0.157)	0.146 (0.154)	0.212 (0.152)	0.228 (0.155)	0.124 (0.133)
ind_construc						0.002* (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
comm_wholesale							0.003** (0.002)	0.003 (0.002)	0.003* (0.002)
comm_retail								0.001 (0.002)	−0.002 (0.002)
tourist_index									0.000*** (0.000)
Summaries									
R-squared	0.212	0.345	0.384	0.399	0.395	0.431	0.481	0.485	0.642
adj. R-squared	0.196	0.319	0.345	0.347	0.329	0.355	0.399	0.389	0.565
sigma	0.012	0.011	0.011	0.011	0.011	0.011	0.010	0.010	0.009
F	13.4	12.9	10.0	7.8	6.0	5.7	5.8	5.1	8.4
p	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Log-likelihood	157.9	162.8	164.3	165.0	164.8	166.4	168.8	169.0	178.4
Deviance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIC	−309.8	−317.5	−318.6	−317.9	−315.6	−316.8	−319.6	−318.0	−334.9
BIC	−304.0	−309.7	−308.9	−306.2	−301.9	−301.1	−302.0	−298.5	−313.4
N	52	52	52	52	52	52	52	52	52

Table 8: Determinants of bank branch location, commercial banks, 1997–2008 (information at NUTS level 3)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Coefficients										
(Intercept)	−0.021*** (0.003)	−0.006 (0.005)	−0.006 (0.005)	−0.016* (0.009)	−0.010 (0.010)	−0.017 (0.011)	−0.018* (0.010)	−0.018* (0.010)	−0.026*** (0.010)	−0.025*** (0.009)
pop_inc	0.539*** (0.186)									
pop_spanish_inc		1.206*** (0.263)	1.203*** (0.279)	0.940*** (0.344)	1.044*** (0.373)	0.792** (0.387)	0.632 (0.381)	0.634 (0.407)	0.518 (0.362)	0.406 (0.326)
pob_foreign		−0.083*** (0.029)	−0.082*** (0.031)	−0.102*** (0.034)	−0.099** (0.039)	−0.089** (0.038)	−0.076** (0.037)	−0.076* (0.039)	−0.055 (0.035)	−0.059* (0.032)
unemploy			0.004 (0.090)	−0.050 (0.099)	−0.021 (0.101)	−0.004 (0.098)	0.044 (0.098)	0.043 (0.100)	0.076 (0.089)	−0.010 (0.085)
vehicles				0.294 (0.228)						
cars					0.213 (0.283)	0.287 (0.279)	0.058 (0.290)	0.059 (0.302)	0.335 (0.278)	0.217 (0.253)
trucks					−0.021 (0.162)	−0.007 (0.158)	0.062 (0.156)	0.061 (0.160)	−0.033 (0.144)	−0.089 (0.132)
ind_construc						0.002* (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
comm_wholesale							0.003** (0.002)	0.003* (0.002)	0.004** (0.002)	0.004** (0.002)
comm_retail								−0.000 (0.002)	−0.003 (0.002)	−0.002 (0.002)
tourist_index									0.000*** (0.000)	0.000** (0.000)
savings_branches										0.278*** (0.090)
unions_branches										−0.042 (0.028)
Summaries										
R-squared	0.144	0.390	0.390	0.411	0.397	0.440	0.491	0.491	0.611	0.702
adj. R-squared	0.127	0.365	0.352	0.360	0.332	0.366	0.410	0.396	0.527	0.620
sigma	0.013	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.009	0.008
F	8.4	15.6	10.2	8.2	6.1	5.9	6.1	5.2	7.3	8.6
p	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Log-likelihood	153.8	162.6	162.6	163.5	163.0	164.9	167.4	167.4	174.3	181.3
Deviance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIC	−301.7	−317.3	−315.3	−315.1	−311.9	−313.8	−316.7	−314.7	−326.6	−336.5
BIC	−295.8	−309.5	−305.5	−303.4	−298.3	−298.2	−299.2	−295.2	−305.2	−311.2
N	52	52	52	52	52	52	52	52	52	52

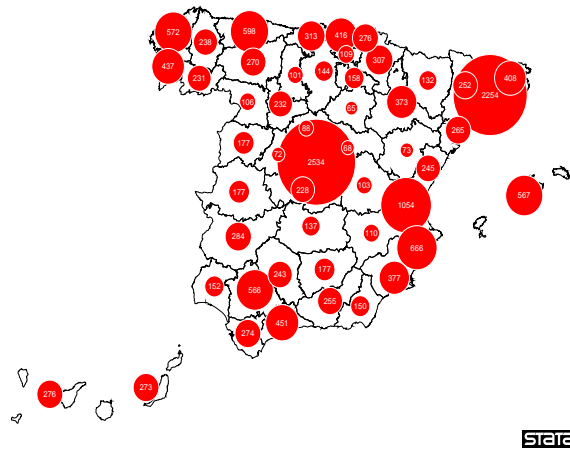
Table 9: Determinants of bank branch location, savings banks, 1997–2008 (information at NUTS level 3)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Coefficients										
(Intercept)	0.023*** (0.004)	0.042*** (0.007)	0.042*** (0.007)	0.038*** (0.013)	0.031** (0.015)	0.027* (0.016)	0.026 (0.016)	0.026 (0.016)	0.012 (0.015)	0.028* (0.015)
pop_inc	0.704*** (0.261)									
pop_spanish_inc		1.381*** (0.397)	1.125*** (0.403)	1.031** (0.505)	0.870 (0.537)	0.716 (0.576)	0.645 (0.592)	0.536 (0.630)	0.354 (0.557)	−0.001 (0.525)
pob_foreign		−0.105** (0.044)	−0.081* (0.044)	−0.087* (0.050)	−0.085 (0.056)	−0.078 (0.057)	−0.073 (0.058)	−0.066 (0.060)	−0.032 (0.053)	0.012 (0.053)
unemploy			0.274** (0.130)	0.255* (0.145)	0.226 (0.145)	0.236 (0.146)	0.257* (0.152)	0.269* (0.154)	0.319** (0.137)	0.265** (0.127)
vehicles				0.105 (0.335)						
cars					0.156 (0.408)	0.202 (0.414)	0.100 (0.450)	0.040 (0.467)	0.472 (0.428)	0.232 (0.402)
trucks					0.152 (0.234)	0.161 (0.235)	0.191 (0.242)	0.215 (0.248)	0.067 (0.223)	0.108 (0.209)
ind_construc						0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.002 (0.002)	0.001 (0.001)
comm_wholesale							0.001 (0.002)	0.001 (0.003)	0.001 (0.003)	−0.002 (0.003)
comm_retail								0.001 (0.003)	−0.003 (0.003)	−0.001 (0.003)
tourist_index									0.000*** (0.000)	0.000* (0.000)
bank_branches										0.696*** (0.224)
unions_branches										0.020 (0.045)
Summaries										
R-squared	0.127	0.281	0.341	0.343	0.352	0.360	0.365	0.369	0.521	0.615
adj. R-squared	0.110	0.252	0.300	0.287	0.281	0.275	0.264	0.252	0.419	0.509
sigma	0.018	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.013
F	7.3	9.6	8.3	6.1	5.0	4.2	3.6	3.1	5.1	5.8
p	0.009	0.000	0.000	0.000	0.001	0.002	0.004	0.007	0.000	0.000
Log-likelihood	136.2	141.2	143.5	143.6	143.9	144.3	144.5	144.6	151.8	157.4
Deviance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIC	−266.4	−274.5	−277.0	−275.1	−273.8	−272.5	−270.9	−269.3	−281.6	−288.9
BIC	−260.5	−266.7	−267.3	−263.4	−260.2	−256.9	−253.4	−249.8	−260.1	−263.5
N	52	52	52	52	52	52	52	52	52	52

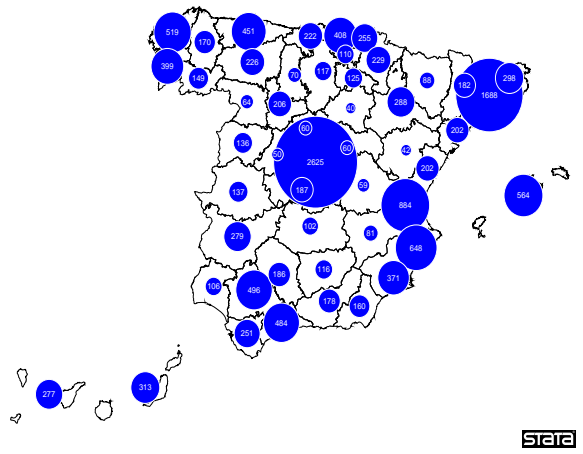
Table 10: Determinants of bank branch location, credit unions, 1997–2008 (information at NUTS level 3)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Coefficients										
(Intercept)	0.050*** (0.011)	0.094*** (0.020)	0.095*** (0.020)	0.105** (0.039)	0.127*** (0.044)	0.139*** (0.047)	0.137*** (0.047)	0.138*** (0.048)	0.115** (0.048)	0.078 (0.054)
pop_inc	−0.273 (0.721)									
pop_spanish_inc		−0.928 (1.140)	−0.768 (1.206)	−0.495 (1.511)	−0.306 (1.601)	0.154 (1.716)	−0.235 (1.747)	−0.012 (1.861)	−0.314 (1.818)	0.271 (1.855)
pob_foreign		−0.309** (0.127)	−0.324** (0.133)	−0.304** (0.149)	−0.372** (0.166)	−0.390** (0.169)	−0.360** (0.170)	−0.375** (0.176)	−0.319* (0.174)	−0.382** (0.178)
unemploy			−0.170 (0.389)	−0.115 (0.433)	−0.061 (0.432)	−0.091 (0.436)	0.025 (0.448)	0.001 (0.456)	0.085 (0.446)	0.104 (0.473)
vehicles				−0.306 (1.003)						
cars					0.187 (1.216)	0.052 (1.234)	−0.503 (1.329)	−0.381 (1.381)	0.333 (1.398)	0.650 (1.423)
trucks					−0.745 (0.697)	−0.770 (0.701)	−0.603 (0.715)	−0.653 (0.734)	−0.897 (0.726)	−0.957 (0.725)
ind_construc						−0.003 (0.004)	−0.006 (0.005)	−0.006 (0.005)	−0.004 (0.005)	−0.002 (0.005)
comm_wholesale							0.008 (0.007)	0.010 (0.009)	0.011 (0.008)	0.015* (0.009)
comm_retail								−0.003 (0.008)	−0.010 (0.009)	−0.013 (0.009)
tourist_index									0.000* (0.000)	0.000** (0.000)
bank_branches										−1.298 (0.859)
savings_branches										0.248 (0.557)
Summaries										
R-squared	0.003	0.114	0.117	0.119	0.139	0.150	0.173	0.176	0.238	0.280
adj. R-squared	−0.017	0.078	0.062	0.044	0.045	0.037	0.041	0.022	0.074	0.082
sigma	0.050	0.047	0.048	0.048	0.048	0.048	0.048	0.049	0.047	0.047
F	0.1	3.1	2.1	1.6	1.5	1.3	1.3	1.1	1.5	1.4
p	0.706	0.052	0.109	0.193	0.214	0.267	0.266	0.354	0.196	0.205
Log-likelihood	83.3	86.4	86.5	86.6	87.2	87.5	88.2	88.3	90.3	91.8
Deviance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
AIC	−160.7	−164.8	−163.0	−161.1	−160.3	−159.0	−158.4	−156.6	−158.7	−157.6
BIC	−154.8	−157.0	−153.3	−149.4	−146.6	−143.4	−140.8	−137.1	−137.2	−132.2
N	52	52	52	52	52	52	52	52	52	52

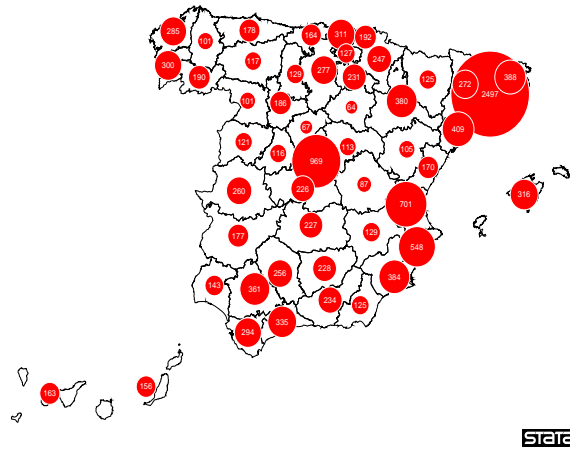
Figure 1: Branches per province (NUTS level 3), Spanish banking sector, 1992 vs. 2008



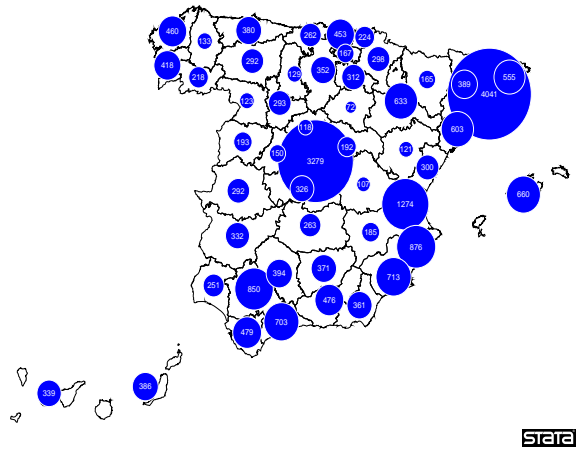
(a) Commercial banks, 1992



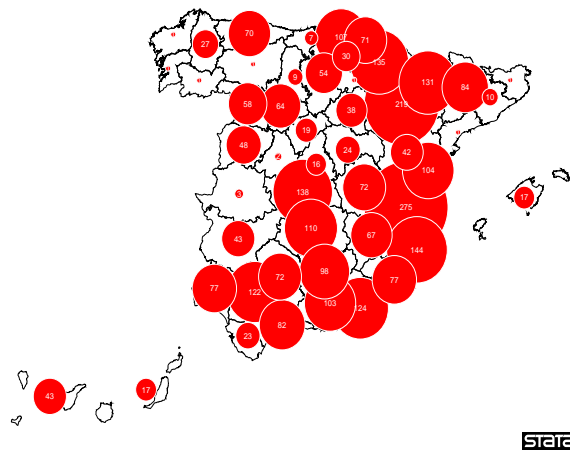
(b) Commercial banks, 2008



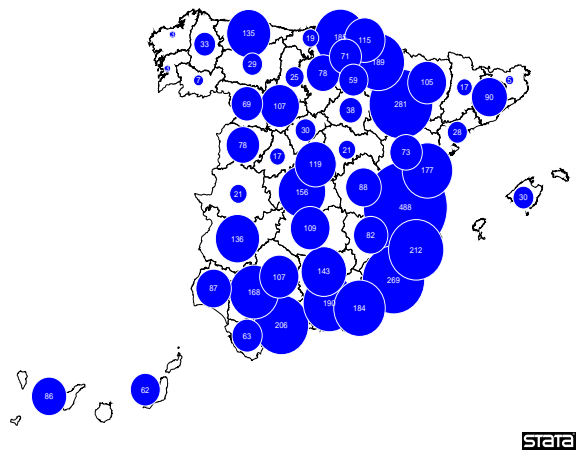
(c) Savings banks, 1992



(d) Savings banks, 2008



(e) Credit unions, 1992



(f) Credit unions, 2008

Figure 2: Growth in total branches by province (NUTS level 3), Spanish banking sector, 1992–2008

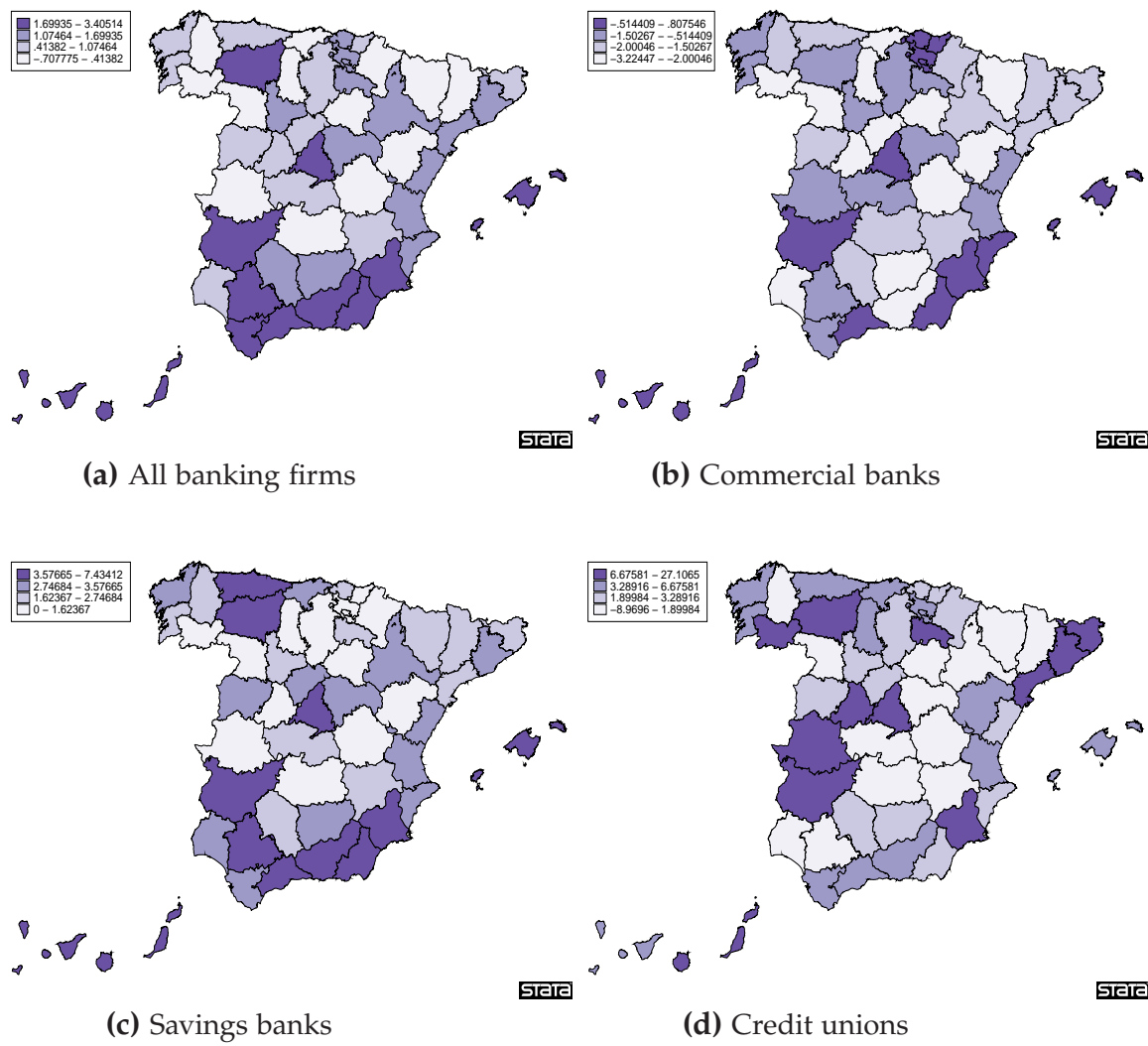


Figure 3: Branches per 10,000 inhabitants (NUTS level 3), Spanish banking sector, 1992 vs. 2008

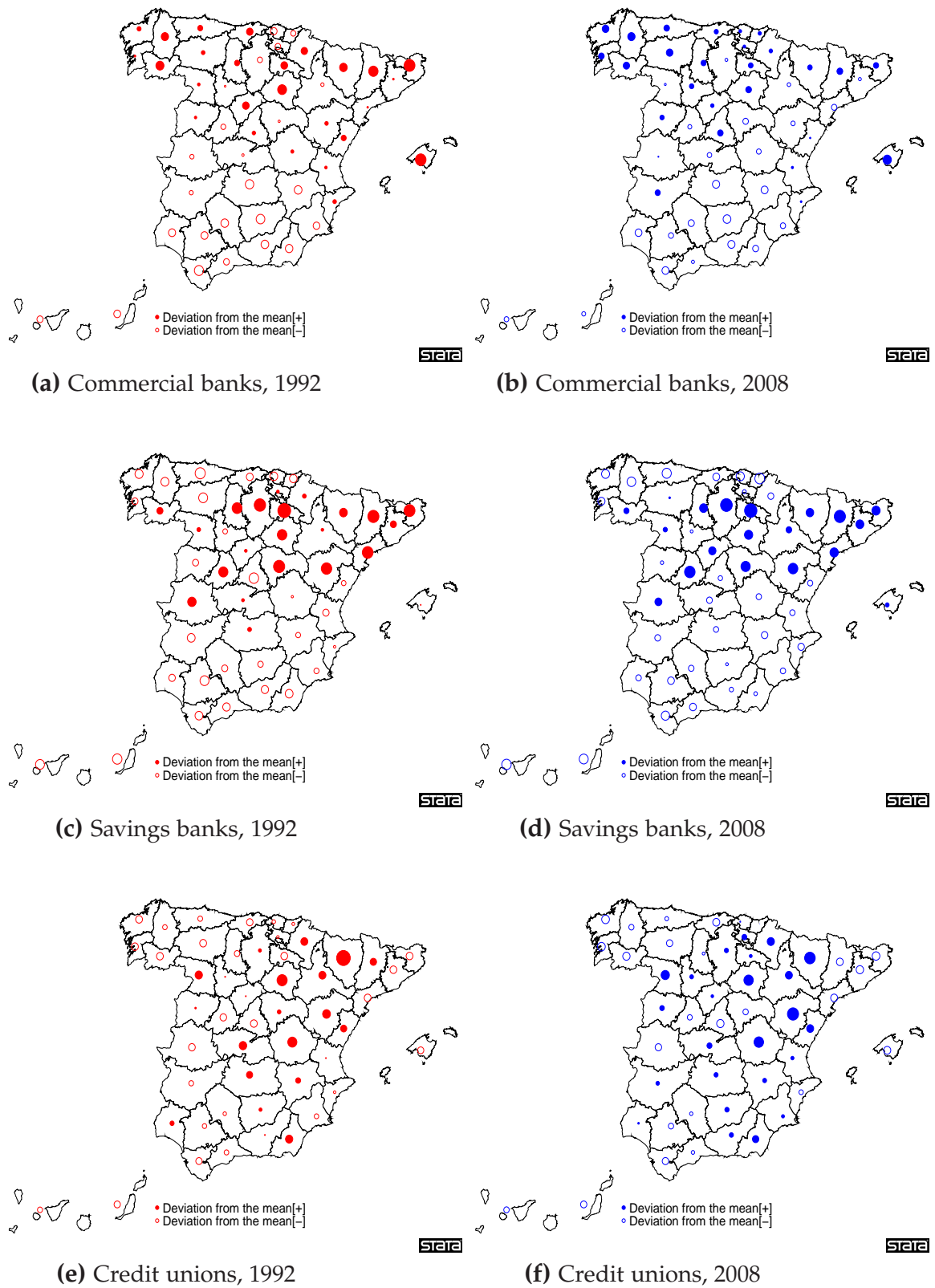


Figure 4: Growth in total branches by province (NUTS level 3) per 10,000 inhabitants, Spanish banking sector, 1992–2008

