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The impact of golf courses in housing demand¹

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Abstract

The paper undertakes the role of golf courses to housing demand mobility in Valencia and Murcia regions, Spain. The study analyzes those characteristics of the golf players owning a golf-course house and their reasons to move to the golf course residential area. The exercise uses methods of Panel econometric analysis applied on primary data obtained from about 1300 questionnaire gathered in main golf courses. Results show how golf courses could have played an important role diversifying residential areas in all regions and attracting new housing demand.

Key words: housing market and golf courses development, local economy, planning strategies, environment

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Introduction

From las fifteen years, most part of the East territory in Spain has seen how the number of golf courses have increase dramatically. Specially last ten years, many municipalities approved the inclusion of golf courses in their land plans and asked for permission to the Regional Authorities to assign the land. Such as expansion in this type of projects lead to Authorities to delay their decision until the analysis about their impacts on environment and their effect on the housing market were better known.

Golf courses in the East region of Spain have, at least, two very relevant implications.

First is the water, because Valencia Community, Murcia and Almería (Andalusia) have strong lack on water supply which is inconsistent with golf course existence due to the stront use of water that it is needed. If the golf course appear, the change on use of the water was the only possibility to feed the green from agricultural use to golf course use as well as to invest in more infrastructures. Those solutions make to be worry to some part of the authorities.

Second is planning. The type of Mediterranean cities use to have high density urban areas. Most golf projects were located in far away from the center areas with non continuity urban space and normally in high quality environment zones, so, to link this

new areas with the city both in terms of public services provision as well as in the land use, are important issues to planning.

But the perception of the increasing welfare and the attraction of economic activity that the golf courses had, make to municipalities to support the appearance of this projects which came, sometimes, from the private sector projects, but in other cases from public projects. Such a diversity of leaders for similar projects and the expected impacts were another reasons to 'wait and analyse' in the permissions.

The effects on housing markets was one of the key issues related with the golf projects in order to explain whether they affect to the supply side, their appearance have further impacts on the housing demand being the answer to a 'new' tastes for local or foreign population, or both. The different impacts seems to be relevant depending on the type of golf course analysed. Among the design of golf courses in the Mediterranean cities, there are urban and out of town projects, private and public, with and without house development, with and without hotel resort, so, their direct impact on housing market must be very different.

Once the golf course is constructed, it also could have positive effect on the surrounding housing market, leading an expansion trend in the area. So, the research question in this paper is whether the golf course do attract housing demand or only has supposed an increase on house supply very diversify according to new tastes of the population, independently of the existence of golf players. This outline suppose a different view regarding the traditional focus of the US Golf projects. Although recently their typology is changing, the Golf courses project in US used to be investment projects in out-of-town locations using cheap land to create high quality resorts around the golf players demand. Mobility of players supported the appearance of the housing resorts associated to golf courses creating a very active housing market inside this typology.

In East of Spain, the recent huge expansion on golf courses seems to respond to other different reasons. Originally, the aim of each project should be similar to those in US but applied to the socioeconomic stage, golf course house markets have been seen as a diversified housing supply, attracting local as well as foreign residents, the way to design green areas in town, changing the 'face of the city, and also as a project to attract new population and economic activities, diversifying also the economy of the city, all around the golf as sport but having impacts in the population not related with it.

After the first golf courses were built the positive impact around them and the huge benefits generalized the perception that it could be good idea to 'have one' in each municipality. Most of them attract foreign residents (many of them retirees) with high income and being the cause that many municipalities included a golf project into the new land planning. This has generated a huge need to coordinate Land Planning in order to maximize public resources and in order to avoid over supply in golf areas with strong damage both for the economy and the land design.

This paper develops an aspect analysed in the report named *Impacto territorial de los campos de golf y operaciones asociadas en el levante español* (Regional impact of golf courses in the Eastern of Spain), supported by the Secretaría General para el Territorio y la Biodiversidad from the Spanish Ministry of Environment. It seeks to find empirical evidence about the impact of golf courses on the population mobility which support the

idea of some golf project could act as attractive center for economic activity further than the one expected by the investment project.

It is answering the research question about the golf courses's attraction of household which is suggested by the specific behaviour of the resident and players of the Spanish golf courses. The response of the households have been obtaining from a primary database produced in the project through a questionnaire passed to more than 1500 people in selected golf courses among Valencia Community and Murcia regions. Then, this paper includes two types of empirical evidence. The first is the behaviour of 'golf population' obtained from a questionnaire which is the first conducted in Europe relating golf tastes and housing decisions. The description of thar reactions is in this paper. Second is the empirical contrast about the appearance of a golf course could change the flow of people to the area where the golf is located, starting the economic growth process. This is done controlling for location which have required to define urban areas and relate the municipality where the golf is with the total area and region.

The paper is organized as follow. Section 1 includes a description of the study area and the golf developments, the experience and golf courses typologies. Section 2 gives the literature review, section 3 shows the empirical evidence with the description of the golf residents and players tastes. Section 4 shows the impact of golf courses in the population mobility, section 5 discusses the results and section 6 concludes.

1. Literature review

The expansion of golf courses along the territory is very new phenomena and usually appears as a investment projects rather than a housing one, so, it is currently analysed under the financial perspective.

The role of the golf course in housing market is not clearly treat by the literature. One of the reasons why there is no very much literature is the difficulty to identify precisely the size and relevance of the golf course in the local economy and population movements as a permanent impact rather than only their impacts as a investment project.

There are some references explaining the golf project, how to design and develop and also its similarities with other leisure investment initiatives (ULI, 2001,2002 and 2006). A more frequent studies treat the golf courses as a specific feature for houses located around it, mostly as the view, analyzing the impact on housing and development. For instance, Kendree, and Rauch, 1990, Wolverton, 1997, theorize about the effects of view on the price of real estate and lots to be build. Beron, Murdoch and Thayer, 2001, analyse the benefits of better views in Los Angeles Metropolitan Area and housing prices. Paul K. Asabere y Forrest E. Huffman (2009) deep on the impact of greenbelts on house prices and conclude that greenbelts (or greenways) are associated with roughly 2, 4, and 5%, price premiums because the proximity to golf course, neighborhood playground, tennis court, private pool, among other amenities.

Recently, some studies undertake the relationship between tourism activity and the existence of golf courses, as in Garau-Vadell and Borja-Sole, 2008.

No studies deep in analyse the general impact on the local economy, so, this is the contribution of this paper.

2. The empirical experience: the role and golf courses typologies.

Along Valencia Community and Murcia regions, the number of golf courses have increased as the housing markets, residents and tourism did. As said above, also the number of projects have risen dramatically with many golf courses built from 2000 and almost three times the existing number awaiting for permission (maps 1 and 2).

Not all the golf courses have similar characteristics. The projects features and their further impacts on the housing market, depends on many variables: the availability of land, the objectives of the investor, and to who the golf course is devoted. As all the area of study received relevant tourism flows, the land available have been in the interior and the golf courses have tend to be build in a more cheaper land away of the cost time to time, but using the best environmental existing space. When the investor is public, the objectives of the golf course are different than the ones promoted by private investors, being seen as green areas or complemented sport services for the community. When is private, the project will be different if it is associated to the existing of an hotel, house development or both.

In the study area, the following typology have been obtain after classified all types of golf courses.

1. According to morphology.
 - Exempts: only golf course
 - Linked to houses: nearly 4.000 houses by operation and a residential gross density of 20 houses per hectare.
 - Linked to hotel resorts.
2. According to management.
 - Public (public ownership, non-profit): play prices are affordable.
 - Business (private ownership): free-access to play paying.
 - Members (private ownership): you must be a member to play (right of admission reserved by the golf club).
3. According to location.
 - Urban: within the existing urban weave.
 - Peri-urban-metropolitan.
 - Coastal region corridor: along the coast.
 - Rural environment: away from the main centres of population.

Maps 3 and 4 shows the space distribution of the different golf courses along the territory.

In the evolution of the site and typologies of golf courses two generations can be distinguished:

- First generation: from the middle of the twenty-century to the end of the twenty-century.
 - It is the result of the introduction of golf as a sport and as a complementary offer for the tourism.
 - Located along the coast and in the vicinity of the main metropolitan areas, and following the location model of area of influence (isochronal).

- Mostly with private management, although some are public, linked to houses and also to hotels.
- Second generation: since the beginning of the twenty-first century.
 - Typological homogeneity: business and linked to houses golf courses
 - Located all over the territory following the main road links.

Four reasons could to be suggested to explain the second generation:

1. Accessibility to airports: thanks to the growth of low cost airlines we could hypothesize the emergency of a new periphery at European level where car and motorway are replaced by airplane and airport in a new dimension of the center-periphery relations.
2. Land profitability: profits by hectare from golf courses are much higher than those from the traditional forms of cultivation predominant in the environment (vineyard, tomatoes, potatoes, lettuces, oranges...), apart from protected garden cultivation (greenhouses) and ornamental flowers and plants.
3. Closeness to other golf courses: in comparison to the model of location based on areas of influence, a “golf cluster” is proposed, thus the player prefers to play in several golf courses located close to each other (ULI, 2006). This model started in USA with the “Trent Jones Golf Trail” with twelve golf courses in the 80’s.
4. Search for profitability in the real estate business: the almost complete saturation of the beachfront causes private agents to search for strategies that keep the profit margin provided by the locations along the coastline.

This residential development model has become known as “*diffuse residential archipelago*”: big residential spaces isolated with an area between 180 and 280 hectares, including the golf course, which normally has 18 holes and an area of 50 hectares, with a capacity for 2.500-3.500 houses and residential densities around 15-20 houses per hectare.

The golf courses clusters exhibit strong mobility. As literature sustain, residential golf courses with low gross residential density (20 houses per hectare) have a number of trips by person by working day of between 1,15 and 1,3, almost half of that of a traditional compact city. This is due to a greater coordination of the activities to be carried out in a single trip as any trip involves taking the car in contrast to the compact city. As almost all the trips in these operations are made by private vehicle (95%), the number of daily trips by vehicle is large and public transport is marginal and it is not able to compete with the private car. Therefore, the main effects on the mobility are related to the associated houses, whereas the ones related to the sports complex are not worrying.

The “Diffuse Residential Archipelago” presents a form of gated communities: settlements based on private security, social exclusion and a private management that, as a whole, turn their back socially and spatially on the city and the land where they are set, and this is promoted by its isolated location and its segregation from the town core where they are set.

- **The golf players and tastes. The data base**

To analyse the pattern driving the players behaviour respect to the housing market, a questionnaire was conducted in order to obtain primary information about the drivers addressing the golf course phenomena. Due to the strong growth experience in Valencia

Community and Murcia, we thought that these regions could be an appropriate laboratory to analyse it and also to check their economic and housing impact.

The process and steps did in order to carry out the questionnaire needed to obtain information about the total golf courses existing in the area. There was no any full listing for golf courses in the sport federation neither in any other public register. We combine all information listing 35 official golf courses in the regions which are represented in map 1. In order to identify and define the urban framework for all courses found, a distribution of territory was taken defining the urban areas according to the level of municipalities and the isocronas around the provinces and counties capitals. This gives a clear picture about the location of golf courses in the urban framework and set the economic bases to carry out the further analysis. 14 urban areas were defined along the coast in all Valencia community and Murcia regions (map 2).

Second step was visit all of them interviewing the general manager in order to obtain general information and establish a classification in the categories related above. List of them can be seen in map 3 and 4.

Third step included selecting a sample of golf courses to be the scenario to collect the information. Regarding the number of 'green-fees' sold given by the responsible of each golf course and also the different typology, the selection was done in order to obtain a representative universe. The total golf courses interviewed and their specialization can be seen in table 1.

Table 1.- Golf courses name and classification				
Golf course	morfology	management	location	questionnaire
A..... Alicante Golf (ALICANTE)	1b/1c	2b	3a	p&h
B.... El Plantío (ALICANTE-ELCHE)	1a	2b	3b	p&h
C.... Club de Golf 'Real de Faula' en Benidorm (ALICANTE)	1c	2b	3c	p&h
D1 ... Torre En Conill (Bétera, VALENCIA)	1b	2b	3b	h
D2.... Club de Golf de Jávea (ALICANTE)	1a/1b	2c	3c	p
F..... Club de Golf Oliva Nova (VALENCIA)	1a/1b	2b	3c	p&h
E Club de Golf Ifach (ALICANTE)	1b	2c	3c	p&h
H Alenda (Monforte - ALICANTE)	1b	2b	3b	p&h
I Sensol (Mazarrón , MURCIA)	1b	2b	3d	p&h
J.... Torre Pacheco (MURCIA)	1b	2a	3b	p&h

1. According to morfology.

- o Exempts: only golf course a p players
- o Linked to houses: nearly 4.000 houses by operation and a residential gross density of 20 houses per hectare. b h houses
- o Linked to hotel resorts. c

2. According to management.

- o Public (public ownership, non-profit): play prices are affordable. a
- o Business (private ownership): free-access to play paying. b
- o Members (private ownership): you must be a member to play (right of admission reserved by the golf club). c

3. According to location.

- o Urban: within the existing urban weave. a
- o Periurban-metropolitan. b
- o Litoral region corridor: along the coast. c
- o Rural environment: away from the main centers of population. d

Two type of questionnaires were designed to interview housing owners and players with four set of variables: (1) sociodemographic questions, (2) housing relationship to ownership, houses characteristics, tenancy or use house in golf course, (3) the pattern as a golf player and (4) the housing mobility when is playing golf. The questionnaire for golf players also included some information about their tourist tastes. The aim was to capture the features and behaviour of:

- 1.- Golf players only
- 2.- Golf players and residents in the golf community
- 3.- Homeowners in a golf course, players or not

A special team of interviewers was created talking in Spanish, English and German mainly trying to capture correctly the combination of nationalities playing or staying in golf courses or urban areas.

The size of database to be obtained was defined in order to obtain representativeness in the data. Main problem was to know the reference universe for both houses and players in golf courses. In the case of the questionnaire for golf players, the universe taken into account was the number of green-fees sold a year and declare by the managers interviewed. The information known was the number of green-fees a year. It is known that the frequency is not constant and in summer more affluence of players must be rather than in winter. However, a supposed of homogeneity among the year was done calculating the affluence by week as:

$$gf_{semanal} = \frac{gf}{52}$$

Being *gf* the green-fees a year.

And covering the eventuality of different affluence and players profile running the questionnaire twice a year, in the top and medium period (April and May of 2007)

In the case of resident and owners, the total existing units from Census was used as universe in each municipality where the golf course was located. The correct reference should be the number of houses in the census area but if was no possible to find the exact location in terms of census track for most of the golf courses. The sample was designed with a error of 0,05

Total questionnaires obtained were 1573 along the golf courses mentioned above and as it is summarized in table 2.

Table 2.- Questionnaires in golf courses			
		Frequency	Percent
By golf course		11,0	0,7
	A	244,0	15,5
	B	167,0	10,6
	C	162,0	10,3
	D1+2	173,0	11,0
	E	107,0	6,8
	F	143,0	9,1

	H	187,0	11,9
	I	233,0	14,8
	J	146,0	9,3
	Total	1573,0	100,0
By type		Frequency	Percent
	No Valid	11,0	0,7
	Players	1163,0	73,9
	Residents	399,0	25,4
	Total	1573,0	100,0

Some descriptive results obtained are²:

- Regarding to residents in the complex:
 - o The average age is around 52 years old.
 - o 43% of them are retired and 47% of the active ones are professionals or directors.
 - o 60% of the owners are foreigners, among them two thirds come from United Kingdom and more than 20% from Germany and Holland.
 - o 42% of the owners or tenants play golf.

- Regarding factors relevant for buying the house:
 - o For 50% of answers the existence of a golf course has been the determining factor to buy the house.
 - o The landscape surrounding the golf course is highly taken into account by 80% of the owners.
 - o The accessibility to the complex is important or very important for more than 60%.
 - o The design of the house is important or very important for more than 70%.

3. The empirical evidence: the model

Descriptives results seems to suggest that there is no clear the full association between players and homeownership in the golf complex. Instead of that, it seems that there is a group of residents in the golf course area showing no relevant entail to golf. These raise to relevant research questions.

1. Whether golf course attract more than one group of population due to the existence of houses development associated to the golf course.
2. If so, whether golf courses could be a polarization factor for the local economy, attracting population.

In order to contrast both questions, this paper carry out two different econometric exercises. Using the database constructed by the questionnaires, a factor analysis are done in order to extract the existing factors leading the choice to reside or play in the golf

² Full results and design of questionnaires are available by requesting to authors

course. As it is explained later, there are more than one group of each who have been attracted by the golf course, suggesting that the answer to question one is that golf course with housing development play a more relevant role rather than be an extra export supply for golfers.

Second exercise contrast those suggested by first one. We use secondary data to check if there is any evidence that could suggest that a change on population and residential mobility has happened due to the appearance of the golf course. The data used in this second exercise come from public sources and compute all population changing residences by municipality in all study area.

4. Empirical exercise: the impact of golf courses in the population mobility

Within this section the two exercises to answer the research question are explained.

- Factor analysis

First, a factorial analysis is carried out in order to obtain the aggregation of variables which could suggest the reasons and features to become resident in a residential golf course development. Using the information from the database generated by the questionnaire, we calculate the factors contained into the data base which should show such aggregation of answers. That factors highlight different group of motivations to choose the golf course both to play or to live exhibit by the persons interviewed.

As the number of questions was very wide creating about 180 different variables, the numbers of them to be factorised was selected among those referring to the socio-economic, housing, play tastes and mobility pattern features of the interviewed, with 50 variables in total to be included.

The extraction of factors in this database have the zero-problem known in the econometric literature. As most questions are related with the tastes, they are not fully answered by all interviewers, forcing factor analysis to replace them when estimate the covariance matrix. The matrix determinant has been $3,98 \text{ E}-0,05$. The KMO and Bartlett test are estimated in order to obtain an accuracy measure of the patterns of collinearity among the variables. A value of KMO test is calculated as 0,661, which gives a middling degree of common variance among the variables, according with the accepted definition.

Fourteen factors have been obtained explaining the 59,8% of the total variance. Their contribution is shown in the Scree plot (figure 1).

Figure 1.

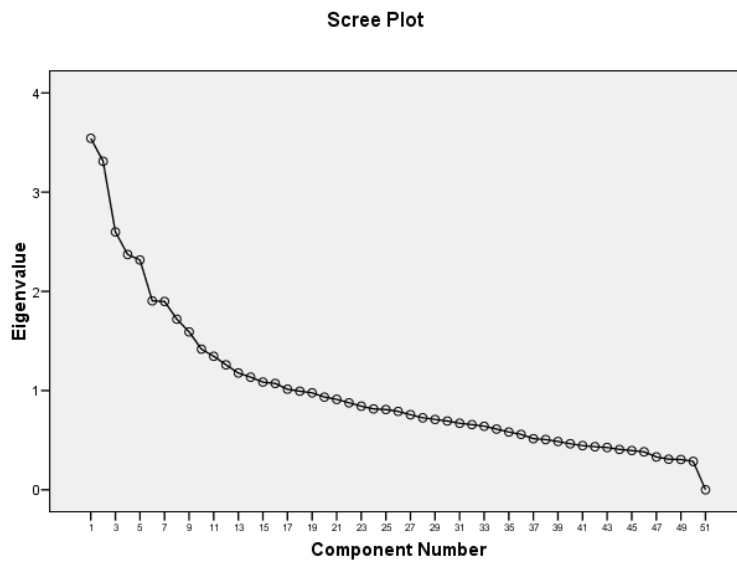


Table 3 contains the factors obtained, loading components and rotation loadings.

Table 3- Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,542	7,084	7,084	3,542	7,084	7,084	3,102	6,204	6,204
2	2,974	5,949	13,033	2,974	5,949	13,033	2,203	4,406	10,610
3	2,585	5,169	18,202	2,585	5,169	18,202	2,179	4,357	14,968
4	2,348	4,695	22,897	2,348	4,695	22,897	2,089	4,178	19,146
5	2,060	4,120	27,018	2,060	4,120	27,018	2,054	4,108	23,254
6	1,898	3,796	30,814	1,898	3,796	30,814	2,044	4,088	27,342
7	1,873	3,745	34,559	1,873	3,745	34,559	1,798	3,595	30,938
8	1,686	3,371	37,931	1,686	3,371	37,931	1,775	3,549	34,487
9	1,589	3,178	41,108	1,589	3,178	41,108	1,602	3,203	37,690
10	1,414	2,827	43,936	1,414	2,827	43,936	1,601	3,201	40,891
11	1,317	2,634	46,570	1,317	2,634	46,570	1,512	3,023	43,915
12	1,208	2,416	48,985	1,208	2,416	48,985	1,504	3,008	46,923
13	1,172	2,344	51,329	1,172	2,344	51,329	1,473	2,947	49,870
14	1,134	2,268	53,597	1,134	2,268	53,597	1,397	2,795	52,664
15	1,081	2,163	55,760	1,081	2,163	55,760	1,279	2,558	55,223
16	1,039	2,077	57,837	1,039	2,077	57,837	1,213	2,426	57,649
17	1,013	2,027	59,864	1,013	2,027	59,864	1,108	2,215	59,864
18	0,987	1,973	61,837						

Table 4 includes the variables explaining each factor and their interpretation. First implication is that it seems very clear perception exist leading he group of tastes which play in the process to decide whether to choose the residence in the golf and to decide to attend to a golf course to play. The factors are clearly delimited showing the group of reasons which consolidate decision units. For instance, buy a house decision in the golf area depends ultimately (as markets says) on the size and price (factor 6), but it is conditioned by the golf course features and the attractiveness of the area (factors 2,8,9 and 10). All factors seems to refer three groups of people, those that buy a house in the golf course, those who are players and buy a house and those who are players and their

resident could be in the golf course interviewed or anywhere else. There are a group of factors refereeing only to players and explaining their behaviour pattern moving among golf courses (factors 1,3,7,12,16 and 17). Others seem to refer the homeowner facing their behaviour as golf player (factor 11,13,14 and 15). In these to last groups, the perception that remain is that there is only a thing line separating both behaviours, just player and homeowner and player which suggest that the decision to buy a house in the golf course only depends of the design, the attractiveness of the area and price. So, competition to capture this demand have to be based in these differential factors.

Table 4: Result of Factor analysis Golf residents and players (Varimax rotation)					
Variable	Correlation with the factor	Factor name	Total	% of Variance	Cumulative %
			X87-Golf course accessibility	0,771	F1
X89-Attractiveness of area	0,759	Determinants to become resident in a golf course			
X88-Tourism supply quality	0,727				
X85- Climate	0,691				
X86- Sea proximity	0,623				
X90-Various golf courses	0,585				
X43-H in a accesible complex	0,727				
X42- H. Near the sea	0,695	Determinants to become owner in a golf course			
X44- Design of the house	0,658				
X41-Climate	0,598				
X84-Availability to play golf	0,713				
X91-Stay because play golf	0,693	Player intention to play golf in the area			
X102-Trips to other golf courses to play	0,617				
X94-Number of golf courses to play	-0,432				
X47-To many other people in the golf	0,758				
X46- limits to use the golf course with other purposes	0,701	Inconvenient to live in a golf course			
X48- High housing prices	0,633				
X49-Ball beat	0,588				
X83-Be homeowner in golf course	0,799				
X107- Availability of stay in other golf courses	0,677	Ownership and golf player residence pattern			
X95- Numbers of trips to other golf courses inside the area	-0,653				
X78- House price	0,773	F6	2,044	4,088	27,342
X34-Housing surface	0,586	Housing price			
X40- Intention to become owner depending on housing price	0,571				
X2- Nationality	0,761	F7	1,798	3,595	30,938
X4 -Age	0,678	Residence reasons by household features			
X6 - Residence location	0,549				
X35- Garden surface	0,745	F8	1,775	3,549	34,487
X33- Type of house	0,716	Housing design in the golf course			
X34-Housing surface	0,552				
X50-Lack on retail services	0,823	F9	1,602	3,203	37,690
X51-Dependence of car	0,771	Inconvenient to buy a house in golf course			
X37-Countryside views	0,803	F10	1,601	3,201	40,891
X36-Have the golf course as leisure uses	0,724	Determinants of buy a house in a golf course			
H0- Tenency	0,838	F11	1,512	3,023	43,915
X82-Stay in vacations or as resident	0,635	Residency in golf course			
X6-Main residence	0,556				
X103-Number of trips to other golf courses	0,698	F12	1,504	3,008	46,923

X94-Number of golf courses to play	0,502	Golf play pattern in the area, travelling to other golf courses			
X136-Relationship between the interviewed and the golf course	-0,439	(negative means be a green fee buyer or no relationship)			
X92-Number of days staying in the golf course	0,743	F13	1,473	2,947	49,870
X93-Number of days to play golf	0,718	Stay to play golf's pattern			
X136-Relationship between the interviewed and the golf course	-0,415				
X104-Number of nights being in other golf courses to play	0,779	F14	1,397	2,795	52,664
X105- Number of other golf courses to play	0,672	Stay in other courses to play golf's pattern			
X23-Period using the house in the golf course	0,644	F15	1,279	2,558	55,223
X78- Income a year	0,503	Housing use pattern			
X10-Labour situation	0,620	F16	1,213	2,426	57,649
X38- Friends houses	-0,494	Economic determinant to visit house in golf course			
X13-Profile of interviewer (player, owner)	0,732	F17	1,213	2,426	57,649
X12-Labour sector where work	0,548	Profile of interviewer			

The independence between the factors refereeing to the reasons to became owners and the golf players patterns also suggest the existence of residents who do not play golf (as the descriptive statistics showed). Classifying the factors strictly between owners and players, we could aggregate all of them as shown in Table 5. Those factors which are mixing both behaviour are highlighted in green.

Table 5. Factor classification

Ownership		Player	
F2	Determinants to become owner in a golf course		
F4	Inconvenients to live in a golf course	F1	Determinants to become resident in a golf course
F5	Ownership and golf player residence pattern	F3	Player intention to play golf in the area
F6	Housing price	F7	Residence reasons by household features
F8	Housing design in the golf course	F12	Golf play pattern in the area, travelling to other golf courses I
F9	Inconvenients to buy a house in golf course	F13	Stay to play golf's pattern
F10	Determinants of buy a house in a golf course	F15	Housing use pattern
F11	Residency in golf course	F16	Economic determinant to visit house in golf course
F14	Stay in other courses to play golf's pattern	F16	Profile of interviewer

Finally, whether the existence of residential development in a golf course seems to move population, both to reside and also to play, the appearance of this type of real estate project have to have economic impacts in the region. It is hard to try to estimate it due to various reasons. One is the location of the golf course should not improve the number of jobs only in the municipality but also in others closer regions or in the county capital. But at least in construction sector, it must to impact on the temporary movements of workers. Their presence also could increase such relocation of population attracted by the golf course characteristics or visitants in the case of the existence of a hotel in the resort.

Those effects have relevance economic implications for the region, but they will depend of how intensive is the investment process or the size of the golf project relative to the economic size and potentiality.

Next section shows the empirical contrast on permanent mobility (household moves among municipalities) when a golf course appears in our study area.

- **Dynamic panel analysis**

In order to contrast whether the golf have had effect on permanent population mobility toward the golf area, a database containing household movements among the space have been used. The database's name is 'Encuesta de Variaciones Residenciales' (residential changes survey, source: INE) which collect all population moving among municipalities in Spain. All data about the different municipalities included in the study (and described before) were extracted and aggregate to obtain the total arrivals to the urban areas and those for each municipality where the golf course was located. The database contains the information available in a long period, 1988 to 2008, yearly basis. The statistics are showed in figures 2.1 to 2.14. Each graph also shows the date when the golf course starts to operate. With this information, a pool is constructed including total arrivals by municipality and year and the date when the golf course was opened as dummy variable.

The aim is to check the existence of any evidence which could suggest that the appearance of the golf course attracted population both to the municipality or the urban area. Then, the following relationships are going to be estimated.

$$Maf = f[mmun, Tcgolf] \quad (1)$$

$$Mmun = f[Tcgolf] \quad (2)$$

Where:

Maf = Population flows for residential purposes to the urban area where the golf course(s) is (are) located

Mmun = Population flows for residential purposes to the municipality where the golf course(s) is (are) located

Tcgolf = Dummy variable capturing the permanente impact had by a golf course when start operation, then,

$$\left. \begin{array}{l} Tcgolf \\ \end{array} \right\} = 1, \text{ from the year it opens} \\ \left. \begin{array}{l} \\ \end{array} \right\} = 0 \text{ otherwise}$$

Total urban areas analysed are 14 but just 12 have golf courses. Information bout population flows is available from 1988 to 2008, yearly and by municipality. Not all golf courses were opened inside this period. Areas 1, and 6 to 14 have got golf courses starting in some year from 1988 to 2008 and, then, the exercise only include information about those urban areas and municipalities.

The functional form adopted here is to catch the shock coming from the innovation in the golf course as:

$$Maf_{it} = \alpha_{1t} + \alpha_{2t}Mmun_{jt} + \alpha_{3t}Tcgolf_{jt} + \phi A_{ij} + \eta_{1t} \quad (3)$$

So, how changes on population flows for residential purposes in the urban area are related with those in municipality associated to the appearance of the golf course.

$$Maf_{it} / Mmun_{it} = \beta_{1t} + \beta_{3t}Tcgolf_{jt} + \gamma A_{ij} + \eta_{2t} \quad (4)$$

Which captures how population flows for residential purposes are related with the start of the golf course,

Where:

- $i = 1, 6 \dots 14$, are the urban area i .
- ' $j = 1 \dots 25$ are the municipality included in the urban area with golf
- A_{ij} are the fix effect of each urban area
- $\eta_{1t,2t}$ are error terms
- α, β are parameters to be estimated

Both equations are estimated using Two Stages Least Square (2SLS) regression methods and the functional form is estimated both in levels (the shock of the presence of golf course on total flows) and in logs (the shock on the acceleration of total flows due to the golf course), allowing for non-linear relations³. Due to the spatial reference for the data, fix effects are estimated to control by urban area. Period Fix effects are also calculated in the models (3), controlling by population flow dynamics⁴. Autocorrelation need to be corrected in those models without period fix effects. Results are shown in table 6.

The results suggest the existence of relevant impact in the start of golf activity in some of the areas not all of them. It seems to be strong relationship among populations flows which suggest that they are independent from the existence of the golf course, so, both municipality and urban area share the trend on people movements (as seen in figures 2) in all areas but Vinaroz, Gandía and Oliva, all in the north of the territory. In the case of Vinaroz (north of Castellon, very north of the study area) the golf course seems to be opened with a negative trend on population flow, but results seems to suggest that there is a marginal positive impact attracting population to the municipality. Results for Denia suggest that there is a negative impact on population flows associated to the start of golf activity. It is also the only area which shows a negative sign which suggest that the start of golf is associated to reducing flow of residents towards the municipality and also the urban area. Alicante around golf courses (Benidorm, Alicante, Muchamiel and Monforte) doesn't show any significant impact. The rest of the areas where the opening of golf courses are statistical significant to the flow of residents, have positive impact and are located in the south of Alicante and Murcia and have the common feature to have appears more recently. Those show strong and significant impact are Rojales, with positive attraction of population both towards the municipality and also to the urban areas, and Algorfa, with effect on the municipality and associated to the general flow of new residents, both located in the south of Alicante.

Murcia golf courses, Murcia, San Javier, Torre Pacheco and Mazarrón, shows significant impact on population flow towards the urban area but not to the municipality, which suggest that these golf courses could be an alternative supply of golf services and act as a 'golf course's network' for players leaving outside the town where they are located. Figure 3 shows the fix effects by area.

Table 6.2 shows the results of the model in logs whose estimations measure the sensibility of residential flows changes to the appearance of the golf course. Results support those obtained in the previous model. In the case of Denia, the innovation related with the start of the golf course is associated to a decrease of 73% on residential flows

³ That is $Maf_{it} = \Phi[e^{\alpha 1 Mmun_{ij}}, Tc_{golf}_{jt}, A_{ij}, \eta]$

⁴ We also check the existence of unit roots in the panel calculating the ADF test (Fisher Chi-square and Choi Z-Statistic) allowing us to reject the null hypothesis to have unit roots in both series of population flows by municipalities

received in the municipality. Due to both flows of population are correlated at 39% , the strictly impact of the opening of golf course is associated to a reduction in the flow of residents at a 18%. The case of Denia is relevant suggesting that the construction of the golf course could had effects on the housing market equilibrium which reduced the residents flow towards that area, which also seems to suggest an increase on housing prices and derived the previous flow of new residents to around regions.

Rojales seems to show the contrary case, showing large elasticity (1,09) on the urban area and increases on residents flow to the municipality at 32,6%. In this case, it can be say that the appearance of the golf course have positive impacts on residents flows to the area, affecting to the enlargement of the housing demand.

The golf courses located in Murcia area do not show any sensibility to explain changes on residents. Only Murcia shows a weak elasticity (0,156) most due to the link among the residential flows in the city and urban area. These seem to suggest that the network of golf courses is an extra supply of golf services for population staying temporary but it doesn't create new residential demand towards the region.

CONCLUSIONS

This paper approach the role of golf courses as attractive of housing demand in a wide Spanish region where the number of golf projects have increase dramatically.. The main interest is to analyse, first, how the expansion of the new golf areas have been taking place, the profile of their demanders and in the second hand, the role of housing development associated to the golf courses as an element to attract residents to the municipality where it is located. The analysis contribute to the literature deepening in the relationship among housing markets and golf society, mostly due to a strong lack on literature analysing the impacts of the golf courses in housing markets. The paper summarize some results of a survey conducted in 16 courses distributed along a wide area in East of Spain, with more than 1500 interviews including specific questions about the housing and residence characteristics of golf players and also about 50 questions exploring their socioeconomic, mobility patterns and tastes. The analysis is faced to answer two research questions: whether golf courses develop residential areas attracting more people than the golf players, and if so, whether the existence of a golf course could act as attraction pole for different types of residents, contributing to the expansion of the local economy.

The paper use two different econometric methodologies to answer the questions. First, using the information from the golf courses database, it uses factor analysis to obtain the main factors explaining the behaviour of golf players respecting the house development and mobility pattern. It identifies three groups of respondent: a group of residents without relationship with the golf as sport, the group of players using golf course houses (owner of friends-family's houses) to stay during the play time, and last group of 'quasi permanent' residents owning the home in golf courses who like play golf and conclude that there are at least two different group of people related with the golf courses development. but they are attracted by the quality of the courses and also of the housing constructed there. These seem to suggest that the appearance of a golf course could modify the population dynamic in the area where it is located.

So, second question contrast whether some significant relationship could be found among the start of the golf course activity and the flows of resident. This is done using the

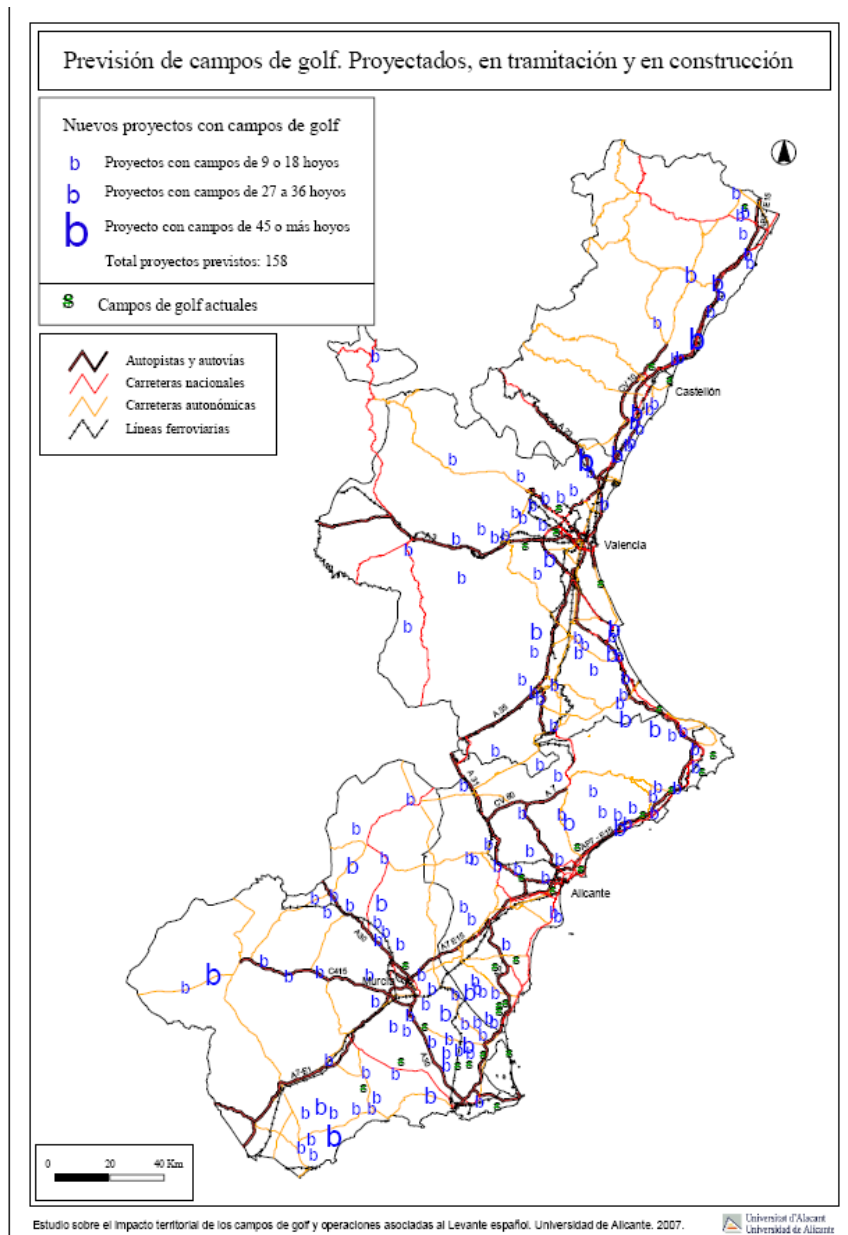
Spanish statistical information about the permanent residents migration, at municipality level. Using panel data and regression methodology, the paper estimate various equations relating the flow of migration for residence reasons around the municipality where the golf course is constructed. The 2SLS exercise conclude that not all golf courses could have the same impact on local mobility, identifying two where the appearance of the golf have had strong impact attracting population, and also defining the 'golf network' which serves as an attractive to golf players to attend the region.

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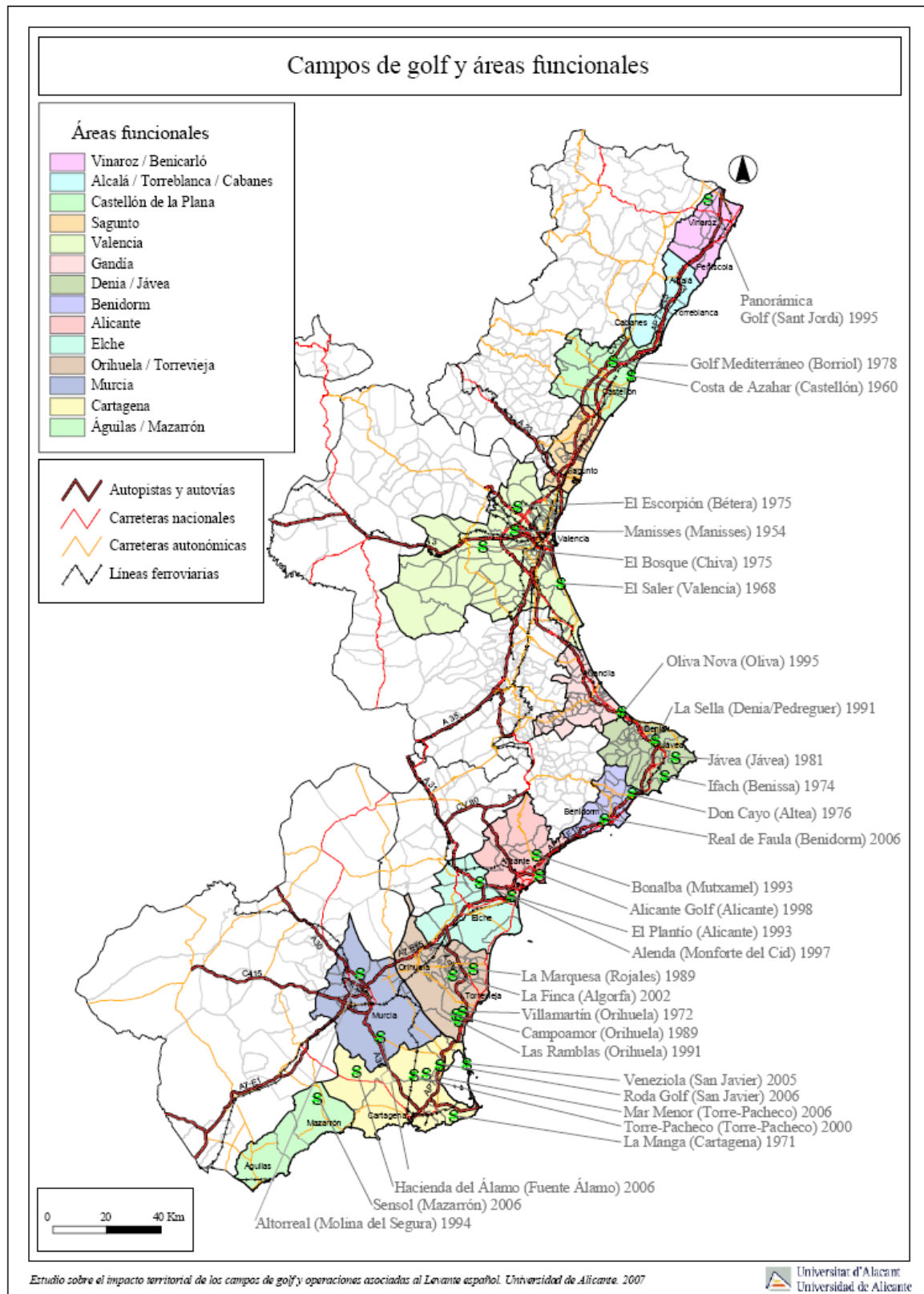
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FIGURES AND TABLES

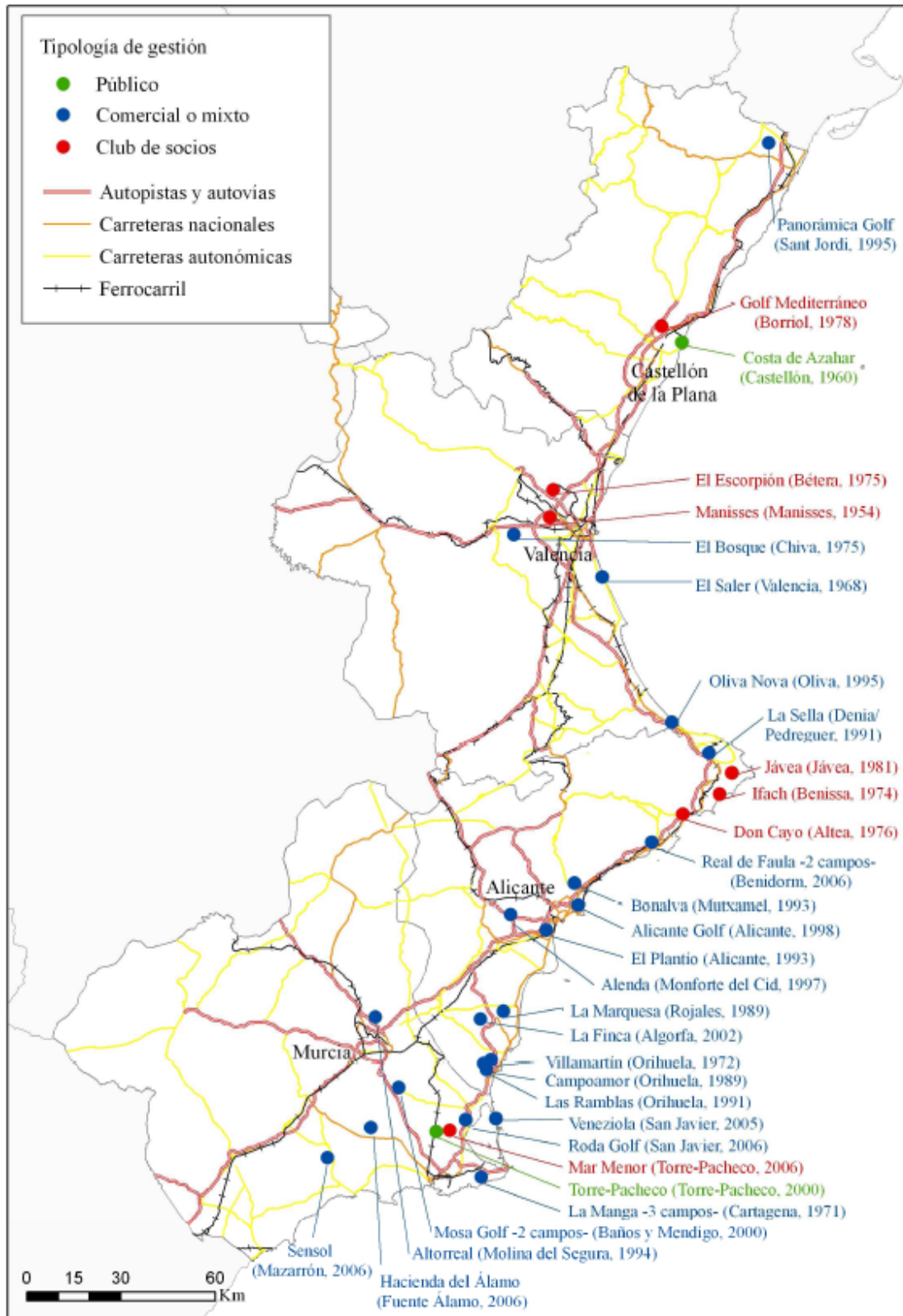
Map 1. Projects of new Golf Courses: projected, administrative process and in construction



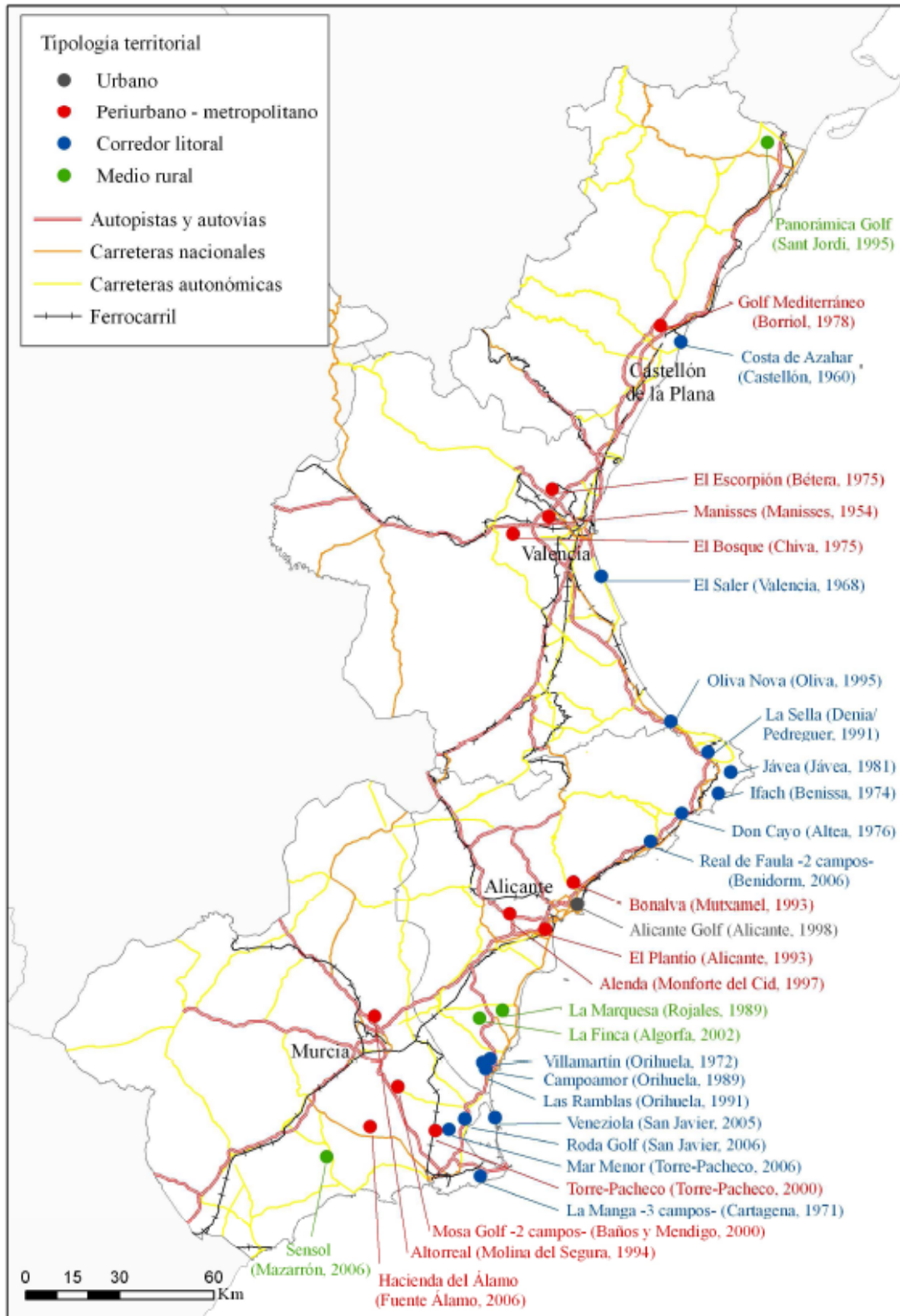
Map 2. Existing Golf Courses, name, urban area and year of construction



Map 3.- Golf course typology 1- Management type



Map 4.- Golf course typology 2- Territorial type



Map 5.- Selected Golf courses

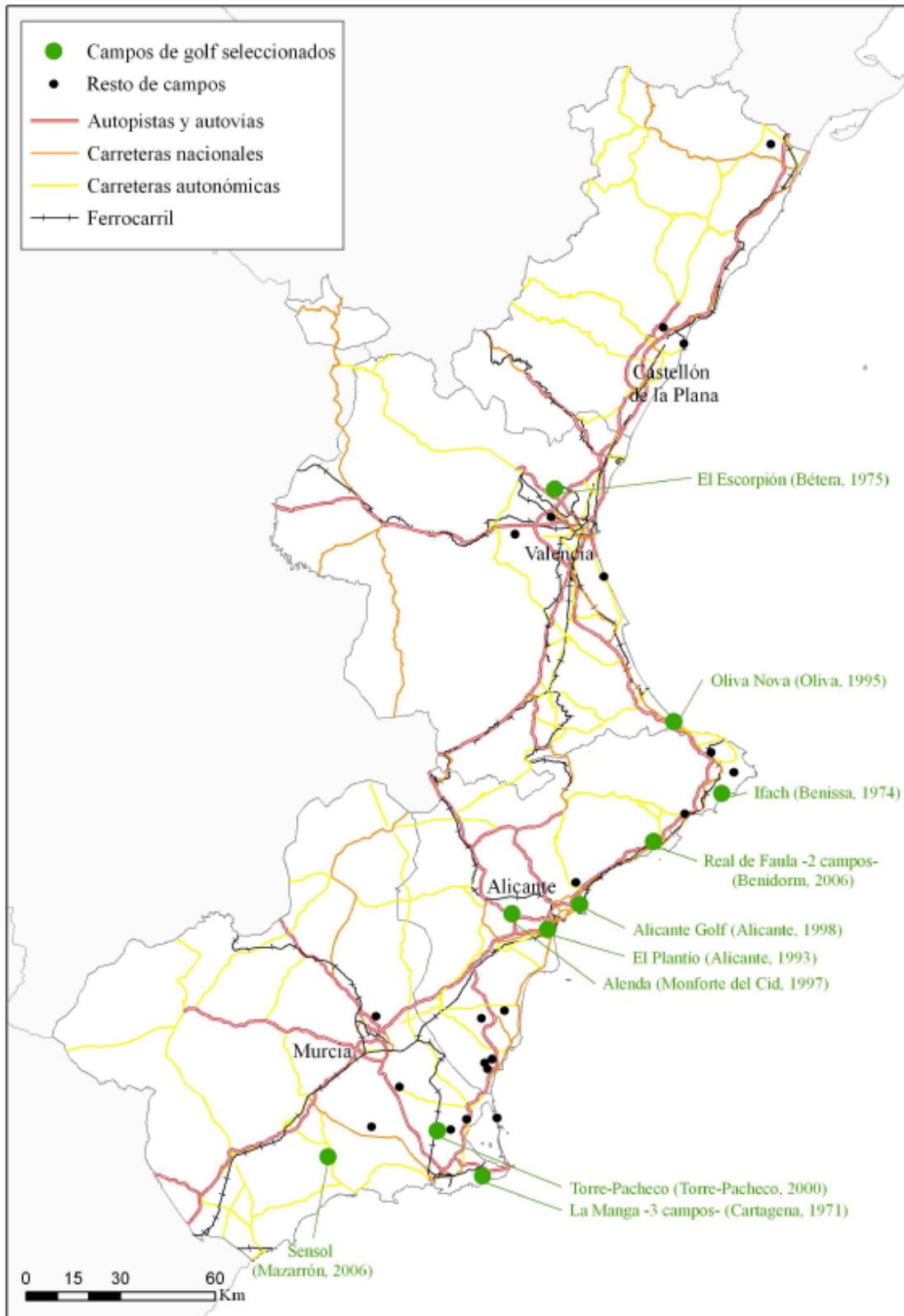
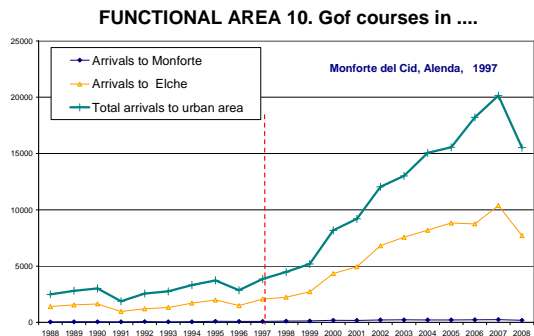
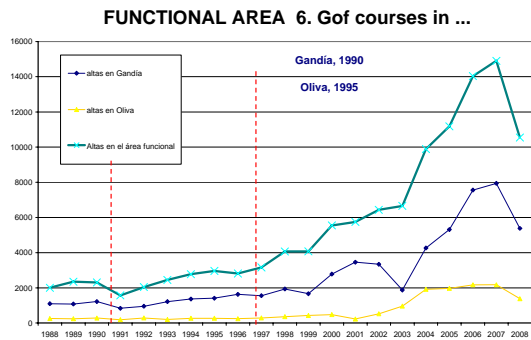
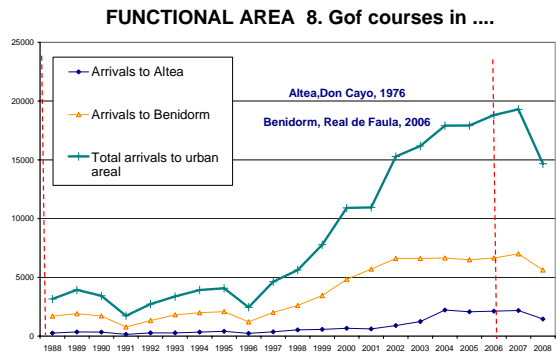
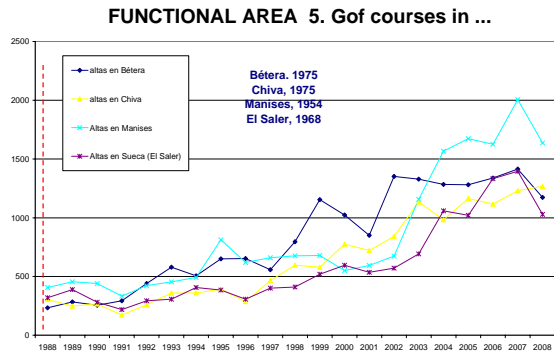
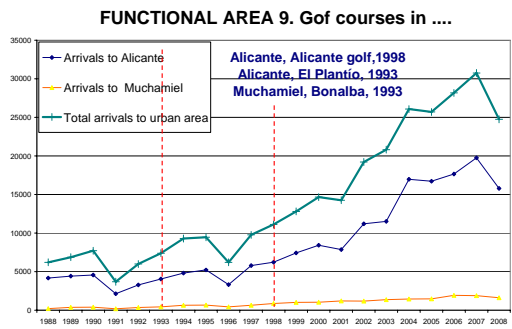
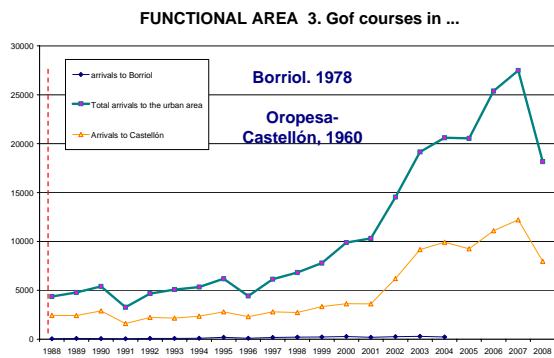
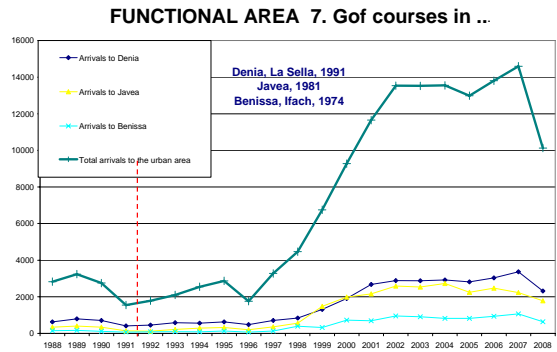
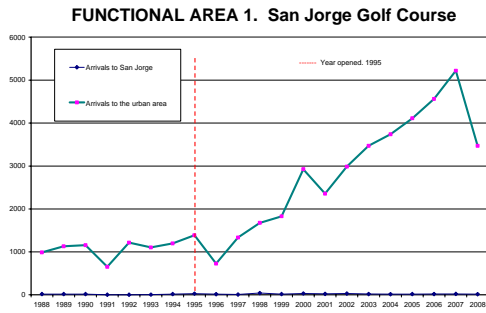
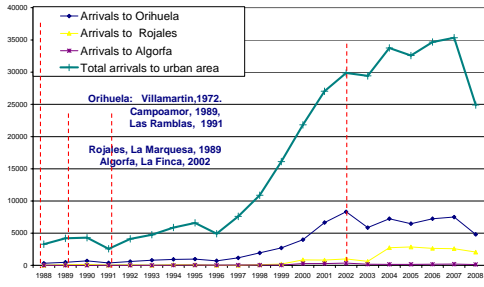


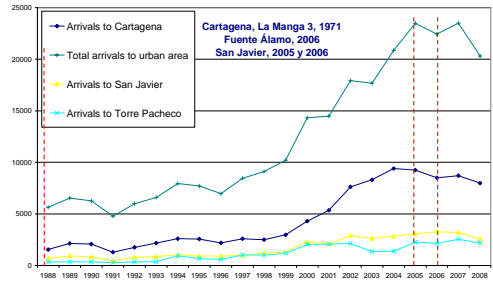
Figure 2.1 to 2.14



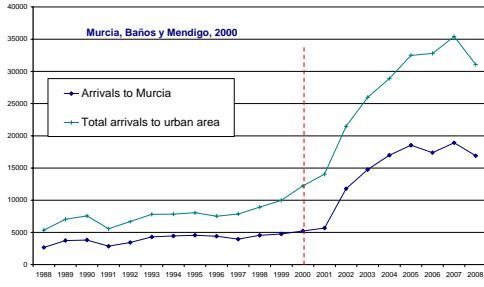
FUNCTIONAL AREA 11. Gof courses in



FUNCTIONAL AREA 13. Gof courses in



FUNCTIONAL AREA 12. Gof courses in



FUNCTIONAL AREA 14. Gof courses in

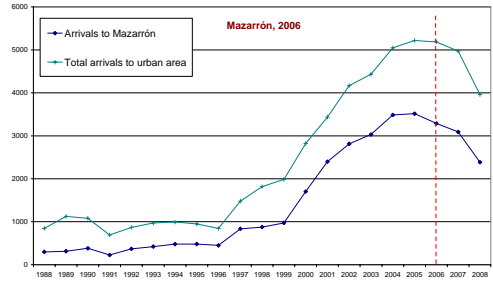


Table 6.1. Population flow related with golf courses models

Method: Pooled IV/Two-stage Least Squares		Cross-section fixed (dummy variables)				Cross-section fixed (dummy variables)				Cross-section fixed (dummy variables)			
		Sample: 1988 2008 Total pool (balanced) observations: 293 White cross-section standard errors & covariance (no d.f. correction) Instrument list: C @CXINST MAREAU? MMUNG? YEAR?				Period fixed (dummy variables)							
Dependent Variable		<i>Maf</i>								<i>Mmun</i>			
		β_1	t-Stat	Prob.	Sign	α	t-Stat	Prob.	Sign	β_2	t-Stat	Prob.	Sign
C		76525,3	0,243	0,808		6605,2	11,431	0,000	***	7183,6	0,495	0,621	
<i>Mmun</i>	A1 VINAROZ					48,0	0,861	0,390					
	A6 GANDIA					0,3	1,575	0,117					
	A6 OLIVA					0,8	1,415	0,159					
	A7 DENIA					1,5	4,555	0,000	***				
	A8 BENIDORM					3,3	8,209	0,000	***				
	A9 ALICANTE1					0,8	12,390	0,000	***				
	A9 MUCHAMIEL					6,7	7,345	0,000	***				
	A10 MONFORTE					39,3	6,187	0,000	***				
	A11 ROJALES					12,2	2,946	0,004	***				
	A11 ALGORFA					52,0	5,407	0,000	***				
	A12 MURCIA					1,1	19,476	0,000	***				
	A13 SAN JAVIER					3,1	8,015	0,000	***				
	A13 T.PACHECO					3,8	5,915	0,000	***				
	A14 MAZARRON					10,2	8,522	0,000	***				
<i>Tcgolf</i>	A1 VINAROZ	64,9	0,555	0,580		-3594,1	-2,868	0,005	***	11,8	4,699	0,000	***
	A6 GANDIA	-541,6	-2,500	0,013	***	-6,6	-0,010	0,992		-115,8	-0,579	0,563	
	A6 OLIVA	-267,7	-1,175	0,241		-381,9	-0,705	0,482		-61,0	-1,202	0,231	
	A7 DENIA	-1708,6	-5,391	0,000	***	-170,5	-0,414	0,679		-424,2	-5,698	0,000	***
	A8 BENIDORM	385,2	0,490	0,625		-224,1	-0,325	0,745		-21,9	-0,155	0,877	
	A9 ALICANTE1	458,1	0,789	0,431		888,9	1,542	0,124		-78,3	-0,181	0,857	
	A9 MUCHAMIEL	465,2	0,788	0,431		-1803,6	-2,549	0,012	**	105,0	1,522	0,129	
	A10 MONFORTE	372,0	1,255	0,211		-1466,2	-1,782	0,076	*	-8,0	-1,469	0,143	
	A11 ROJALES	4364,5	6,897	0,000	***	9545,9	2,949	0,004	***	165,5	9,038	0,000	***
	A11 ALGORFA	1869,9	1,425	0,155		8870,5	5,348	0,000	***	59,1	2,377	0,018	**
	A12 MURCIA	1086,0	2,248	0,025	**	991,9	1,791	0,075	*	-120,1	-0,314	0,754	
	A13 SAN JAVIER	2060,8	2,701	0,007	***	51,2	0,086	0,931		167,9	1,217	0,225	
	A13 T.PACHECO	-1771,3	-2,029	0,044	**	-325,2	-0,349	0,727		-182,8	-1,400	0,163	
	A14 MAZARRON	3606,7	1,424	0,156		20182,1	3,797	0,000	***	-317,5	-1,621	0,106	
ar(1)		1,0	17,952	0,000	***					1,0	12,962	0,000	***
Fixed Effects (Cross)													
	A1 VINAROZ	-64452,5				-2795,6				-7196,6			
	A6 GANDIA	-33422,0				-1791,9				2846,9			
	A6 OLIVA	-34859,6				-1312,4				-4479,6			
	A7 DENIA	-31159,9				-1697,6				-1782,3			
	A8 BENIDORM	-22183,0				-1600,7				-3935,0			
	A9 ALICANTE1	11247,6				365,9				20546,7			
	A9 MUCHAMIEL	11098,6				70,2				-3673,3			
	A10 MONFORTE	-17246,1				-3178,7				-6793,0			
	A11 ROJALES	8295,8				877,8				-6069,3			
	A11 ALGORFA	19935,8				1438,4				-6986,4			
	A12 MURCIA	38705,8				-715,4				24543,2			
	A13 SAN JAVIER	-13020,7				509,5				-2686,0			
	A13 T.PACHECO	3191,1				1251,0				-2648,2			
	A14 MAZARRON	123869,0				8579,5				-1687,1			
Fixed Effects (Period)													
	1988--C					-2476,3							
	1989--C					-3414,5							
	1990--C					-3177,6							
	1991--C					-4014,7							
	1992--C					-3834,0							
	1993--C					-3128,2							
	1994--C					-2833,5							
	1995--C					-2312,9							
	1996--C					-2863,0							

1997--C		-2374,6	
1998--C		-1538,0	
1999--C		-995,9	
2000--C		-561,3	
2001--C		1184,6	
2002--C		1180,4	
2003--C		2731,9	
2004--C		5215,6	
2005--C		5713,6	
2006--C		5917,8	
2007--C		6836,3	
2008--C		4744,4	
R-squared	0,9	1,0	1,0
Adjusted R-squared	0,9	1,0	0,9
S,E, of regression	2915,9	2212,6	817,8
F-statistic	160,0	135,4	187,3
Prob(F-statistic)	0,0	0,0	0,0
Instrument rank	71,0	76,0	71,0
Mean dependent var	12671,1	12336,8	2179,1
S,D, dependent var	12006,7	11909,2	3629,6
Sum squared resid	2,13E+09	1,14E+09	1,68E+08
Durbin-Watson stat	1,7	1,6	1,9
Second-stage SSR	2,13E+09	1,14E+09	1,68E+08

*** Significant at 0,01
** Signif at 0,05
* Signif at 0,1

Figure 3

Golf courses models: Fix effects by urban area

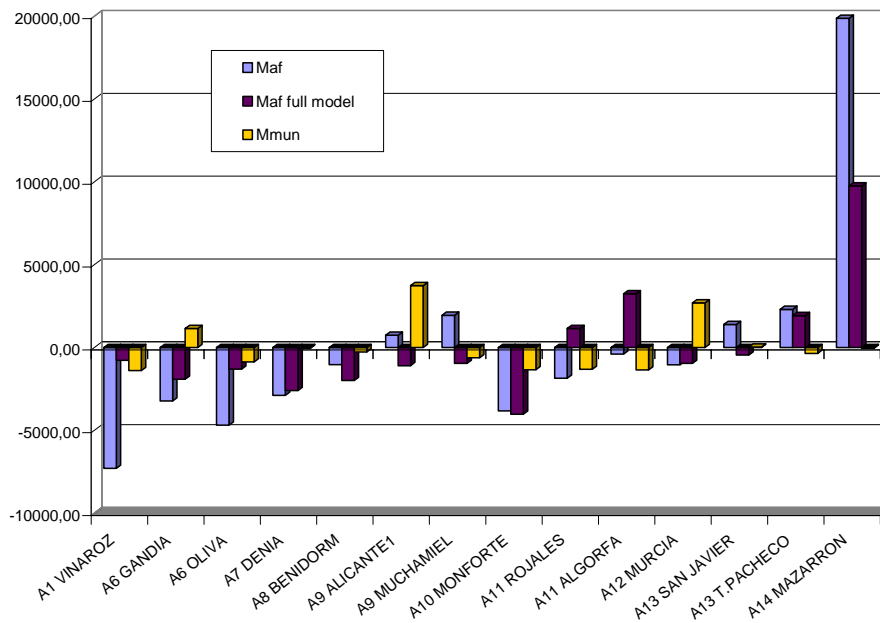


Table 6.2. Population flow related with golf courses models

Method: Pooled IV/Two-stage Least Squares													
Sample: 1988 2008 Total pool (balanced) observations: 293 White cross-section standard errors & covariance (no d.f. correction) Instrument list: C @CXINST MAREAU? MMUNG? YEAR?		Cross-section fixed (dummy variables)				Cross-section fixed (dummy variables)				Cross-section fixed (dummy variables)			
						Period fixed (dummy variables)							
Dependent Variable		Log(Maf)								Log(Mmun)			
		β1	t-Stat	Prob,	Sign	α	t-Stat	Prob,	Sign	β2	t-Stat	Prob,	Sign
C <i>Log(Mmun)</i>	A1 VINARoz	6,89	16,66	0,000	***	7,87	47,18	0,000	***	10,130	10,300	0,000	
	A6 GANDIA					0,06	1,03	0,303					
	A6 OLIVA					0,21	5,59	0,000	***				
	A7 DENIA					0,14	3,76	0,000	***				
	A8 BENIDORM					0,39	7,65	0,000	***				
	A9 ALICANTE1					0,30	9,46	0,000	***				
	A9 MUCHAMIEL					0,18	2,60	0,010	***				
	A10 MONFORTE					0,05	1,29	0,198					
	A11 ROJALES					0,46	6,22	0,000	***				
	A11 ALGORFA					0,07	0,77	0,441					
	A12 MURCIA					0,31	11,67	0,000	***				
	A13 SAN JAVIER					0,33	7,94	0,000	***				
	A13 T.PACHECO					0,00	-0,13	0,895					
	A14 MAZARRON					0,01	0,23	0,817					
	<i>Tcgolf</i>	A1 VINARoz	0,64	1,76	0,079	*	-0,01	-0,19	0,848		0,091	0,877	0,381
A6 GANDIA		-0,01	-0,17	0,863		0,01	0,29	0,771		-0,159	-2,516	0,013	***
A6 OLIVA		-0,01	-0,03	0,978		0,07	2,03	0,043	**	-0,017	-0,244	0,808	
A7 DENIA		-0,72	-6,77	0,000	***	-0,18	-2,77	0,006	***	-0,730	-7,992	0,000	***
A8 BENIDORM		0,04	0,45	0,654		-0,06	-2,04	0,043	**	0,022	0,359	0,720	
A9 ALICANTE1		0,13	0,73	0,468		-0,14	-1,83	0,069	*	0,085	0,874	0,383	
A9 MUCHAMIEL		0,20	1,07	0,287		0,06	0,83	0,407		0,143	1,130	0,260	
A10 MONFORTE		-0,01	-0,07	0,941		-0,13	-1,35	0,178		0,239	2,439	0,015	***
A11 ROJALES		1,09	5,44	0,000	***	0,57	2,46	0,015	***	0,326	5,326	0,000	***
A11 ALGORFA		0,27	1,11	0,269		-0,07	-0,82	0,411		0,037	0,542	0,588	
A12 MURCIA		0,14	0,82	0,411		-0,20	-3,21	0,002	***	0,156	2,876	0,004	***
A13 SAN JAVIER		0,11	1,53	0,128		-0,02	-0,61	0,540		0,093	1,969	0,050	**
A13 T.PACHECO		-0,01	-0,10	0,918		-0,06	-1,88	0,061	*	-0,069	-1,427	0,155	
A14 MAZARRON		-0,02	-0,26	0,794		0,23	2,21	0,028	**	0,106	0,979	0,329	
ar(1)		0,86	18,30	0,000	***					0,935	16,104	0,000	***
Fixed Effects (Cross)													
	A1 VINARoz	-4,93				-0,48				-1,790			
	A6 GANDIA	1,34				-1,11				-0,239			
	A6 OLIVA	-0,14				-0,39				-0,480			
	A7 DENIA	1,52				-1,89				0,566			
	A8 BENIDORM	0,39				-1,06				-0,186			
	A9 ALICANTE1	2,31				0,01				0,185			
	A9 MUCHAMIEL	0,51				1,15				0,075			
	A10 MONFORTE	-1,64				-1,31				-0,410			
	A11 ROJALES	-1,58				0,85				0,326			
	A11 ALGORFA	-2,32				0,25				0,684			
	A12 MURCIA	2,41				-1,22				0,418			
	A13 SAN JAVIER	0,77				1,46				0,026			
	A13 T.PACHECO	0,61				1,38				0,172			
	A14 MAZARRON	0,74				2,36				0,652			
Fixed Effects (Period)													
	1988--C					-0,59							
	1989--C					-0,52							
	1990--C					-0,49							
	1991--C					-0,86							
	1992--C					-0,62							
	1993--C					-0,49							
	1994--C					-0,37							
	1995--C					-0,35							
	1996--C					-0,56							

1997--C		-0,29	
1998--C		-0,10	
1999--C		0,01	
2000--C		0,23	
2001--C		0,31	
2002--C		0,47	
2003--C		0,53	
2004--C		0,68	
2005--C		0,73	
2006--C		0,79	
2007--C		0,84	
2008--C		0,64	
R-squared	0,96	0,99	0,940
Adjusted R-squared	0,96	0,98	0,933
S,E, of regression	0,39	0,13	0,243
F-statistic	226,30	241,58	140,708
Prob(F-statistic)	0,00	0,00	0,000
Instrument rank	71,00	76,00	71,000
Mean dependent var	6,47	9,00	9,041
S,D, dependent var	1,88	0,95	0,941
Sum squared resid	37,65	3,85	14,810
Durbin-Watson stat	2,37	1,48	2,251
Second-stage SSR	37,65	4,08	14,810

*** Significant at 0,01
** Signif at 0,05
* Signif at 0,1

Figure 4

