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Understanding structural adjustment in Spanish arable crop farms: policies, technology and multifunctionality

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Abstract

The objective of this paper is to analyse the process of adjustment for arable crop farms on the inland plains of Spain from the early 1990s, as well as the implications of this adjustment in terms of multifunctionality. This paper first aims, through farm-level analysis, to break down the process of adjustment by isolating the main stylised facts. The second aim of this paper is to re-construct the process around three elements: policies, technology and its relationships with the surrounding rural setting. Results from the research show that the impact of policies stems not only from the level of support, but also from the specific tools through which this support operates and their effects over land tenancy regimes. Technological change has played a key role during the process, since the search for economies of scale is one of the driving forces for farmers who are expanding in an effort to overcome the price/cost squeeze. In addition, structural adjustment has had implications on the «territorial integration» of this agriculture, as well as on its environmental effects.

Additional key words: common agricultural policy, structural adjustment, technological change.

Resumen

Ajuste estructural en las explotaciones con herbáceos españolas: políticas, tecnología y multifuncionalidad

El objetivo de este trabajo es analizar el proceso de ajuste estructural de las explotaciones con herbáceos de las llanuras del interior de España desde principios de los 90, así como las implicaciones de dicho proceso en términos de multifuncionalidad. Con este fin, este trabajo pretende, primero, desglosar los principales rasgos del proceso de ajuste por medio de un análisis a nivel de explotación, y segundo, reconstruir dicho proceso en torno a tres elementos: políticas, tecnología y las relaciones que tiene con su entorno rural. Los resultados de la investigación muestran que el impacto de las políticas no sólo depende del grado de apoyo, sino también del tipo de instrumentos específicos que se utilizan y sus efectos sobre los regímenes de tenencia de la tierra. El cambio tecnológico ha jugado un papel clave durante el proceso de ajuste, dado que la búsqueda de economías de escala es una de las motivaciones de los agricultores en expansión, que intentan superar el estrechamiento de los márgenes de beneficios. Asimismo, el ajuste estructural está teniendo implicaciones sobre la «integración territorial» de esta agricultura, así como en sus efectos medioambientales.

Palabras clave adicionales: ajuste estructural, cambio tecnológico, política agraria común.

Introduction[1]

The aim of this paper is to analyse the process of adjustment for arable crop farms on the inland plains of Spain from the early 1990s, as well as the implications of this adjustment in terms of both the rural and the environmental functions of this agricultural system. This analysis is based upon the research of a highly representative case study, where a first glance could show that what has occurred during this period is not very different from what has been happening for decades: the number of farms has diminished; the average size of remaining ones has increased; mechanisation has continued advancing, and people have continued leaving

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[1] Abbreviations used: AGA (another gainful activity), AWU (agricultural work unit), CAP (Common Agricultural Policy), INE (Instituto Nacional de Estadística), MAPA (Ministerio de Agricultura, Pesca y Alimentación), MTR (mid term review), NM (net margins), OECD (Organisation for Economic Co-operation and Development), UAA (utilised agricultural area).

the countryside. This is referred to as structural adjustments in agriculture.

This subject is of particular interest now for a few reasons. The first reason is that this classic model of structural adjustment in agriculture is still taking place in the European countryside[2], despite its obscurity in both the present political arena and the academic sphere. Indeed, recent literature has drawn attention to a model of agricultural development in which economies of scale and the relevance of size would open the door to the search for economies of scope[3] through diversification. The model suggests that farm enlargement is gradually exhausted as a business strategy to overcome the price/cost squeeze endangering the survival of many farms. This debate focuses on the validity and diffusion of a post-productivist regime in agriculture —see Wilson (2001) or Evans *et al*. (2002).

Second, despite being a classic topic, there is no definitive theory on structural adjustment. There is a certain consensus regarding the most relevant factors affecting the adjustment as well as the role that some of them play —see Arnalte and Estruch (2001) for an overview of the main conditioning factors. Among the key factors, agricultural policies are acknowledged to have a special relevance, although it is less clear which tendency (acceleration or slowing down) they promote, since empirical and theoretical models provide contradictory results with regard to the impact of direct payments on farm size (Ahearn *et al*., 2004). For instance, according to the land market hypothesis developed in the early 1990s, the introduction of direct payments for arable crops within the 1992 Common Agricultural Policy (CAP) reform was expected to slow down the rates of adjustment. However, in the 1990s the annual rate in the disappearance of holdings in Spain trebled that of the previous decade. In addition, this process has been more pronounced in agricultural systems that depend heavily on CAP support. These facts highlight the need to reveal the mechanism of transmission by which CAP intervenes in the structural evolution of farms.

Third, the nature of the link between agriculture and its social and environmental context lies largely in farm structures. As Burton and Walford (2005, p. 336) claim, farm size continues to be a crucial question regarding the territorial (social and environmental) implications of policy applications. Moreover, these implications do not only stem from farm size, but also from other elements such as land property relationships, labour requirements, plot configuration or productive orientations. Thus, all these structural variables condition the effectiveness of policies in terms of their contribution to the «multifunctional» model of agriculture (European Commission, 1999), and strongly impact whether this agriculture is a suitable means for promoting rural development.

These three points shape the theoretical framework of this research while highlighting the interest of this paper. Namely, the focus of this research is to analyse how structural adjustments have taken place on Spanish arable crop farms since the early 1990s. Furthermore, we focus on the implications of this process in terms of its «rural» integration as well as environmental and land use effects.

Method and information sources

The case study used for this research was conducted within Campos county (see Fig. 1), which is a region with characteristics typical of the inland Spanish plains. The impact of policies on this agricultural system has

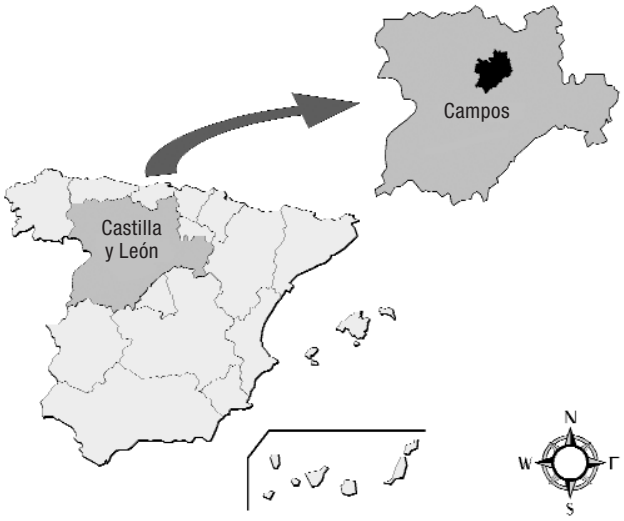


Figure 1. Map of Spain and location of Campos study area.

[2] As the data of Eurostat's «Farm Structure Surveys» continue showing.

[3] According to Mansfield (1997, p. 259) «[e]*conomies of scope exist when a single firm producing various products jointly can produce them more cheaply than if each product is produced by a separate firm*». In other words, economies of scope are related to the exploitation of joint production and on-farm diversification so as to face the reduction of farm economic margins. See van der Ploeg *et al.* (2000) for the theoretical basis of this approach within the field of rural development.

aroused the interest of other Spanish studies (see for instance Castillo and Moreno, 1996), although they have not directly focused on the structural dimension of such impacts.

From the agricultural perspective, this area is dominated [97% of the Utilised Agricultural Area (UAA)] by low productivity, rain-fed arable crops (average cereal yields being 2.5 Mg ha^{-1}). Cereals, sunflower and alfalfa are the major crops. The land is completely and constantly occupied despite the intense process of structural adjustment, which has resulted in a 25% drop in the number of arable crop farms and an enlargement of those remaining (38% increase of average UAA). From a territorial perspective, sectoral dynamics and the maintenance of land occupation coexist with an ongoing rural decline. As in the majority of rural areas in the region of Castilla y Leon, Campos has undergone (and is still experiencing) a dramatic and lengthy process of depopulation (see Table 1). In short, these agricultural and rural attributes make up a common scenario for the vast inland territories of Spain. The results obtained from our analysis could contribute to the understanding of the dynamics of this type of contexts.

The process of structural adjustment in agriculture is the aggregate result at the macro level (region, country) of a set of decisions at the micro level (holding). Therefore, to understand the rationale behind such a process, an analysis from data at the farm level is required.

The structural data of holdings were extracted from the exploitation of the original database from the Agricultural Censuses of 1989 and 1999, performed by the Spanish *Instituto Nacional de Estadística* (INE). Therefore, we had access to the individual micro-data of all farms within the study area in both years. However, the exploitation of this rich quantitative information presented two main limitations for the purpose of the research. First, census data do not allow the identification of the same holding in 1989 and 1999, so it is not possible to follow the «structural path» of each farm throughout the studied period. Second, in spite of the amount of information contained in the database, the technological dimension —which played a key role during the process of adjustment—, is not sufficiently detailed (e.g. there is no information about technical programmes).

Because of these limitations, fieldwork was carried out to obtain further information necessary to better understand the linkage between the two structural scenarios depicted by the Censuses. Namely, information was gathered about the relevant variables conditioning the structural strategies of farmers, the structure of income and costs of farms in 1989 and 1999, as well as the role of technological changes in contributing to the adjustment. With this purpose, we carried out:

— In-depth interviews with representatives of the Agricultural and Economy Departments of the regional government of Castilla y Leon, technical staff of agricultural cooperatives, experts on farm technology from the University of Valladolid (located near the study area), and selected farmers who were pointed out in previous interviews as having a deep knowledge of the evolution of agriculture in the study area.

— Focus groups with representatives of farmer unions, and with technical staff of the regional agricultural administration. These groups were especially useful to select the grouping variables to identify farm profiles, and afterwards, to contrast the farm types obtained through multivariate analysis (see below).

These meetings took place between January 2003 and January 2005, and they were developed as a dynamic feedback process (see Fig. 2).

The analysis was based upon the identification of homogeneous groups of holdings from the Censuses database. The variables that, according to data compiled in the interviews and focus groups, might explain the different patterns of structural evolution were: (i) farm size (hectares of UAA), (ii) percentage of owned area, and (iii) possibilities of demographic continuity of the farm (either with a young holder or with guaranteed generational renewal). However, only the first two variables were finally considered given the high correlation of both demographic continuity and holder age with the percentage of owned land[4].

Grouping was done through a two-step cluster analysis (with SPSS 12.0), which allowed identifying homoge-

Table 1. General data of the study area (Campos)

— Area: 1,081 km^2
— Number of municipalities: 32
— Population, 2001: 7,142
— Population density, 2001: 6.6 inhab km^{-2}
— Evolution of population, 1981-1991: –13.6%
— Evolution of population, 1991-2001: –17.2%

Source: Spanish National Institute of Statistics (INE). Population Censuses 1981, 1991 and 2001.

[4] As explained below, young farmers are more prone than older holders to increase farm size through land rental.

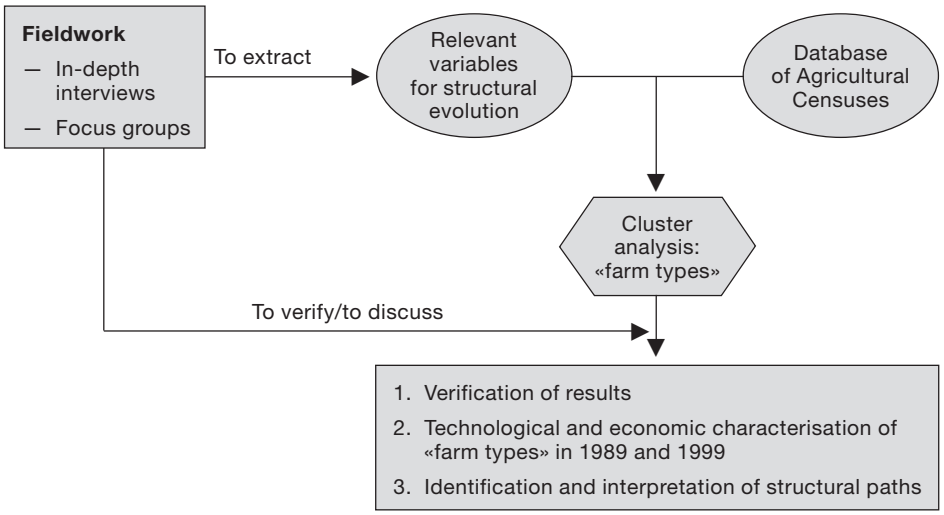


Figure 2. The scheme of the analysis.

neous groups of holdings according to the selected grouping variables, maximizing inter-groups and minimizing intra-groups differences (Hair *et al*., 1998). In this way, we avoided the arbitrary selection of quantitative thresholds to construct farm types. Moreover, the two-dimensional grouping was easily understandable by interviewees and coherent with the farm typologies identified from fieldwork.

Cluster analysis was applied using a database containing simultaneously holdings from both 1989 and 1999. Thus, a set of common groups for both years was obtained (an approach similar to that taken by García Alonso *et al*., 2002). Moreover, clusters with either 1989 or 1999 data give group profiles similar to the single grouping with both years, though with a different distribution of holdings among groups. This fact strengthens the reliability of the analysis.

In order to identify and understand the «movements» of farms among the groups between 1989 and 1999, three aspects were addressed after cluster analysis: a) variations in the number of farms belonging to each group during this period, as well as the UAA they occupied; b) changes in the structure of income and costs of farms which are representative of the groups in both years (farm types); in this point, fieldwork provided the basic information; c) modifications in the profile (from variables not included in the cluster) of the «farm types».

These three sets of results constitute the main quantitative elements of the adjustment, which are presented in the two following sections. Although this part of the analysis is necessarily focused on the inter-census period (i.e. the 1990s) many of the conclusions are valid for the last five years, since, as extracted from the interviews, the process has continued in a similar way since the beginning of the current decade.

Breaking down structural adjustment

Cluster analysis allowed the identification of representative groups of holdings in the study area. The final number of clusters was determined by seeking farm profiles coherent with fieldwork information. Grouping with selected variables (UAA and percentage of land under ownership) resulted in the farm types specified in Table 2.

The process of structural adjustment is the result of both farm abandonment and moves of holdings among groups. Variations in the number of holdings (Fig. 3) and UAA (released by some groups and collected from others, Fig. 4) allow an initial interpretation of the process, as well as an initial description of the role that each group of farms played. This analysis about the role of groups and the links among them is supported by fieldwork information (see previous epigraph).

Four different cases are identified from these figures:

— Groups in which the number of farms fell by more than the average of the study area include small-owned (G1) and medium-rented holdings (G7 and G9). In these three groups, there was an «exit» of farms, either because they disappeared or because they moved to another group. These holders are the main releasers of the land necessary for the resizing of growing farms.

Table 2. Farm type descriptions

	Brief description	UUA[a] (ha)[b]	Owned land (%)	Number of holdings	
				1989	1999
G1	Small-owned farms	14.01	100	576	360
G2	Medium-owned farms	54.97	91	151	125
G3	Medium-large farms with half ownership	70.73	58	150	117
G4	Very large owned farms	282.32	82	35	42
G5	Large owned farms	136.12	96	62	74
G6	Large rented farms	165.84	21	94	105
G7	Medium rented farms	57.72	32	149	76
G8	Very large rented farms	373.07	22	17	37
G9	Fully-rented medium-sized farms	46.89	03	183	123
G10	Enormous farms	704.32	94	15	15
Average		75.43	68		
Total				1,432	1,074

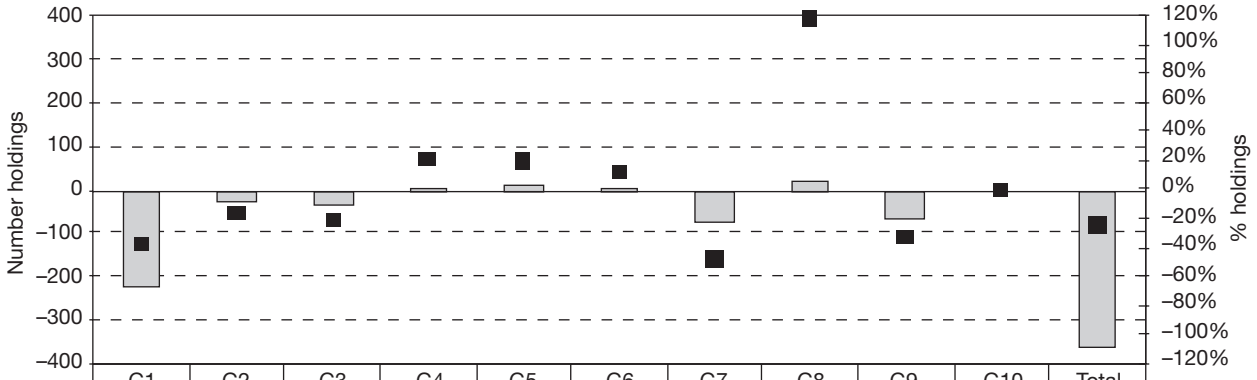
[a] Utilized agricultural area. [b] Centroids of grouping variables. *Source:* Authors' elaboration.

— There are fewer and fewer medium and medium-large holdings with a higher percentage of owned land (G2 and G3), although the percentage of reduction is below the area average. These are groups in which the «exit» of farms is dominant, yet fieldwork shows that they also present a certain flow of entrance. This inflow is explained because ownership became a transitory refuge for retiring farmers with larger farms, who joined these groups since, as they aged, they gradually released the land they had rented and maintained their ownership.

— An opposing process is seen in those groups whose numbers increased (large and very large holdings), reflecting the relative importance of the two strategies of size enlargement: land rental and land purchase. Land rental is the main strategy, as indicated by the rise G6 and G8 in terms of number of holdings and area occupied. This is the path taken by professional farmers who opted for more aggressive strategies.

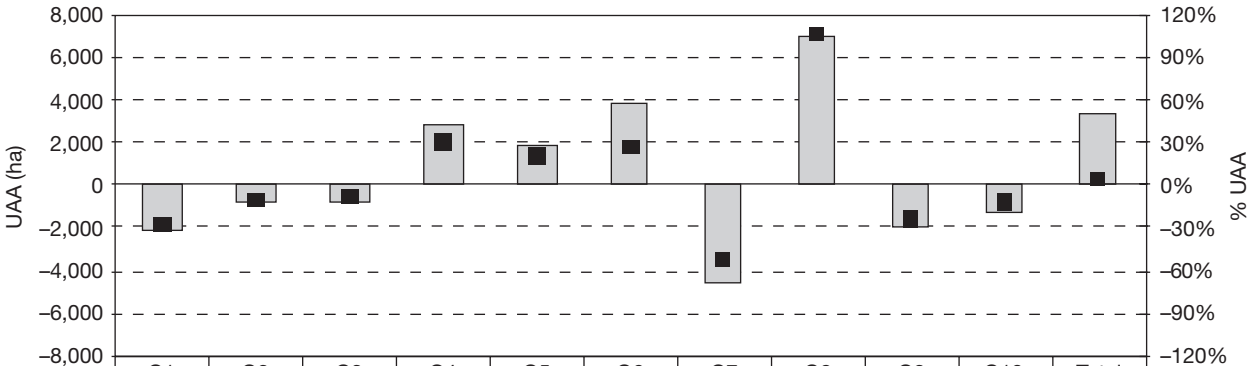
— The expansion through land purchase is reflected by the increase in G4 and G5. This option is less likely (as the variation in the number of farms and hectares indicated), due to the high price of land, which prevented many farmers from expanding through land purchase.

The second set of results characterize the evolution of the economic performance of representative farms. The main driving force of the adjustment was the price/cost squeeze, which was highly affected by the CAP



	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	Total
Var. N.	–216	–26	–33	7	12	11	–73	20	–60	0	–358
Var. N. (%)	–38%	–17%	–22%	20%	19%	12%	–49%	118%	–33%	0%	–25%

Figure 3. Distribution of variations in the number of holdings. *Source:* Authors' elaboration.



	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	Total
Var UAA	–2,188	–858	–808	2,763	1,708	3,777	–4,704	6,925	–2,037	–1,388	3,189
Var UAA (%)	–29%	–11%	–8%	29%	20%	26%	–53%	105%	–25%	–12%	3%

Figure 4. Distribution of variations in Utilised Agricultural Area (UAA). *Source:* Authors' elaboration.

evolution. Indeed, the data in Table 3 indicate how drastically the net margins of representative holdings fell between 1989 and 1999.

In addition, changes are not limited exclusively to these variations; they are also reflected in the changing profiles of both holdings and holders. Thus, evolution left its mark in terms of the farmers' ages, the fragmentation of holdings, and the machinery used on these farms. These elements, combined with fieldwork information, are used in the next section to explain this process of structural adjustment.

Table 3. Net margins[a] (constant € 1999) of holding types (1989 and 1999)

	1989	1999	Variation	
			(€)	(%)
G1	2,918	2,938	20	0.7
G2	9,403	4,668	–4,735	–50.4
G3	10,704	5,512	–5,191	–48.5
G4	60,040	53,949	–6,091	–10.1
G5	30,962	22,406	–8,555	–27.6
G6	25,450	12,856	–12,593	–49.5
G7	6,571	1,791	–4,780	–72.7
G8	64,354	42,993	–21,361	–33.2
G9	3,719	–1,691	–5,410	–145.5
G10	182,106	150,350	–31,756	–17.4

[a] Calculations were made considering the dominant technology each year (conventional sowing in 1989 and minimum tillage in 1999). Results are gross margins minus machinery depreciation and costs of land rental. *Source:* Authors' elaboration.

Reconstructing structural adjustment

Policies

As expected, results show the relevance of agricultural policies in the process of adjustment in a sector highly dependent on CAP support. The deep MacSharry Reform of 1992 (Fernández Torres, 2000), which was based on the partial substitution of institutional prices by direct payments, brought on a completely new scenario. To assess the degree of impact, one must identify the mechanisms of transmission by which the economic stimuli prompted by policies affect farmers' structural decisions.

The level of support largely determines farm profitability in this agricultural system. In this regard, the MacSharry Reform had two main effects throughout the 1990s. In the first years, the forecasted reduction of institutional prices did not take place in Spain since it coincided with *peseta*[5] devaluations during the «monetary storm» of that time. Interviewees agreed that direct payments transitorily overcompensated the expected income loss, becoming a temporary financial «breather» and allowing many farms to undertake a major machinery renewal. Thus, many farmers purchased new and more powerful tractors that increased their work capacity, as well as their per hectare amortizations.

However, the price/cost squeeze finally appeared and many farms were no longer sufficient in economic terms to sustain the family economy. As Table 3 shows,

[5] The *peseta* was the currency in Spain until 2002.

there is a general drop in net margins for farm types (excepting for G1). Such evolution is the aggregate outcome (in real terms) of a decrease of incomes and an increase of land rents and amortizations. The drop in incomes varies from –5% for G1 to –20% for G5.

Moreover, farm structures are very sensitive not only to the level of public support, but also to the specific tools used to implement such support. The modification of the nature of support (from production to land) further conditioned how the adjustment proceeded. One of the key aspects of this process is the transfer of land from disappearing and retiring farms to expanding ones. The tenancy regimes channelling the transfer of land property rights are essential aspects to assess the economic and institutional foundations underlying the new structure of holdings.

According to field information, the introduction of per hectare payments made owners more reluctant to sell their land. As noted above, during the first years of the CAP Reform, payments increased land profitability, which was transferred to land value. Moreover, many owners perceived that support was no longer based on production (that belonged to the farmer) but rather on the land (that was theirs). In addition, it was a more secure and transparent income, subjected neither to weather conditions nor to the farmer's effort. The falling propensity to sell caused a contraction of the land available for sale as well as a dramatic rise in prices (67% at constant prices between 1993 and 1999 for rain-fed arable land in Castilla y Leon)[6]. Consequently, the demand for the substitutive good expanded, i.e. renting underwent notable growth, which explains the apparent contradiction between the rigidity of the land sale market and the magnitude of the adjustment. The increase in the demand for renting pushed prices upwards. In accordance to primary data, between 1989 and 1999, average rents rose from 74.9 to 120.1 € ha^{-1} (at constant 1999 prices). This rise of 60.5% had a greater impact on farms which were more dependent on this tenancy regime (G7 and G9), becoming for some of them the main expenditure item.

This evolution partially challenges Buckwell's claim (Buckwell, 2004) that if total public support does not rise, then there would not be extra value to accrue to the land —in terms of either land prices or rents. Although initially land prices and rents increased due to the rise of per hectare profitability, they later presented a higher resistance to decrease despite the reduction of such profitability. The reason is that the new institutional nature of support altered the «rules of the game» between tenants and landowners, and, as Buckwell (2004) acknowledged, the share of support depends on the relative market power, which changed with the 1992 CAP.

This performance of land markets made the economic and institutional basis of farm structures more fragile, not only because of the increase of renting, but also from a rise in the physical fragmentation of holdings (with more numerous and smaller plots, see Fig. 5). Indeed, farm expansion was possible at the expense of a weaker structural configuration, which complicated farm management, increased certain transportation costs and reduced the potential for economies of scale of several technological packages. In this regard, groups representing enlargement through land purchase (G4 and G5) showed a rise in farm fragmentation greater than rented-farm groups (G6 and G8), even when the former had larger plots in 1989. One explanation for this is that this strategy forced holders to be less demanding in terms of plot characteristics and to purchase smaller plots than when renting, whose supply was notably higher.

In any event, there are two simultaneous processes of (a) farm concentration and (b) fragmentation of both the land ownership and the physical base of farms. This leads to the question of land consolidation. Many of the interviewed subjects claimed that public programmes of land consolidation would be needed in order to improve the economic efficiency of farms. Nonetheless, the efforts

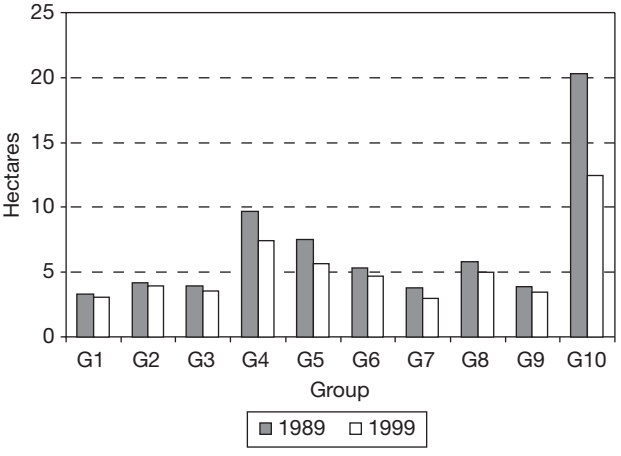


Figure 5. Size of average plots of farm types. *Source:* Authors' elaboration.

[6] According to the Land Price Survey of the Spanish *Ministerio de Agricultura Pesca y Alimentación* (MAPA).

of the current regional government are aimed more to promote farm consolidation on irrigated areas (as an accompanying measure to modernisation projects of irrigation infrastructures) than to face this situation on dry lands, like Campos.

Technology

Research based upon fieldwork also revealed the relevance of technological factors (namely economies of scale and new farming operations) in the evolution of this type of agriculture, becoming other stimuli for adjustment. Firstly, the search for economies of scale, which is one of the pillars of the modernisation paradigm in agriculture, continued influencing farmers' decisions. The tractor fleet renewal, combined with the diffusion of minimum tillage, allowed holders to manage very large (200-250 ha) farms and take advantage of substantial economies of scale. However, this technology did not act exclusively as a facilitator of growth, since new machinery also increased per hectare amortizations and fed the necessity to expand.

In this regard, census data show an increase in the percentage of small and medium farms resorting to outsourcing as a way to lessen their limitations and take advantage of economies of scale[7]. However, according to interviewees, a situation of machinery over-sizing remains in medium-large (and even large) farms, since professional farmers are reluctant to lose control over the programming of some tasks —mainly land preparation for sowing, which is the main bottle-neck of labour requirements. Only harvesting is regularly outsourced.

The second relevant technological factor for the structural change during the 1990s was the generalised substitution of conventional with minimum tillage, i.e. replacing the more «mechanical» technical programme with one more «chemical». This meant a reduction of farm work in terms of the number and intensity of activities for land preparation at the expense of an increase in the use of herbicides. This new programme led to a decrease in fuel and lubricating oil costs, as well as a drop of per hectare labour requirements, which allowed the «individual» farmer to manage larger farms. However, minimum tillage raised amortization since it forced the farmer to complement (not substitute) machinery implements, which increased fixed capital stock. The aggregate results of tractor renewal and implement purchase caused amortizations to increase between 15% and 25% in real terms for representative farm types.

Structural paths reflect these changes in different ways. Older farmers without demographic renewal within their family opted to stop investing in the replacement of machinery and gradually released hectares (firstly from rented and later from owned land), becoming something of «capital consumers» (Lobley and Potter, 2004). These farms would enter in groups G2 and G3 (coming from rented-larger farms), partially compensating the exit of younger farmers. Holders involved in growth strategies (younger farmers or those with generational replacement) adopted the aforementioned technological changes. In this regard, holders expanding through the accumulation of rented land entered into the technological race in a more intensive manner, making larger investments in machinery than those farmers who purchased land. Clusters clearly show how, in comparison to owned farms of similar dimensions, large and very large rented-farms have more tractors (and more powerful ones), as well as younger holders.

These younger farmers adopt a more aggressive and riskier strategy, which is considered by some farmers to be a «leap in the dark». Here, the impact of what Potter and Lobley (1996b) call the «new blood effect» materialized in terms of farm enlargement through renting and machinery investments. This trend continues even now, as direct sowing has begun to substitute minimum tillage in some (very large) farms. Hence, technological forces are still driving the enlargement, since the optimal work size of direct sowing is larger than that of minimum tillage.

Structural adjustment and the «other» functions of agriculture

The third part of this analysis relates to how the structural evolution has affected the ability of this faming system to contribute to the «other» functions of agriculture, namely the rural and the environmental components. This point becomes a crucial issue in Campos, where the agricultural development, strongly

[7] Outsourcing is a generalised strategy in other agricultural systems in Spain (e.g. citriculture in the Mediterranean regions, see Arnalte, 1992, and Reig-Martínez and Picazo-Tadeo, 2004).

supported by the CAP, coexists with the ongoing deterioration of the rural setting.

Regarding the rural function of agriculture, the amount and the characteristics of farm labour are acknowledged as one of the key linkages between farms and the rural economy (OECD, 2001). In this sense, two aspects are addressed: the evolution of family farm labour, and the role of part-time labour.

First, this arable crop farming system requires low labour inputs. In 1999, sixty-eight percent of the holdings involved a single person in farm work, while on sixty-five percent of these same holdings, labour was below one Agricultural Work Unit. Hagedorn (2003) argued that the farm family constitutes an «integrating institution» (in comparison with «segregating institutions») where interdependence among family members working on the farm acts as an obstacle for structural adjustment. Therefore, in a system as the one analysed here, the integrating character of the family dissipates, as well as the resistance that it presents to the mechanisms of adjustment. Results show that individual holdings (those with only one family member involved in farm work) are more prone to disappear for all farm types.

A second interpretation of the low labour requirements of this farming system is the combination with off-farm activities. The traditional argument defending part-time farming as an alternative to the disappearance of small and medium-sized farms has become more relevant in recent years, especially in terms of multi-functional agriculture and its positive «spillover effects» on the surrounding rural areas (Van der Ploeg *et al*., 2000).

In our study area, results show that, at the aggregate level, the drop in the number of holders with another gainful activity (AGA) was similar to the general rate of farm disappearance (27%). However, a more detailed reading indicates that some recessive groups show a differential trend depending on the presence of holders with or without AGA (Table 4). Within groups where the number of holdings decrease, this reduction is more pronounced when holders do not have AGA –G1 the only exception. This might indicate that part-time farming is indeed a survival mechanism for medium-size holdings. Even in G2, the net drop in holdings conceals a slight rise in those whose holders have AGA.

Nevertheless, this relative resistance of part-time farms has had scarce rural effects, since the other lucrative activity is usually not located in the rural setting, but in nearby cities (mainly Palencia and Valladolid). So many farmers preferred to move their residence to urban areas and to commute to the farms when necessary. In addition, this farm-work/residence pattern is applicable to many full-time professional farmers, even to those adopting expansive and modernization strategies. Farmers who tended to move to nearby cities become what Arnalte and Ortiz (2003) denominated as «inverse commuters».

Table 4. Holders[a] with another gainful activity (AGA)

	1989		1999	
	Number	% of the group	Number	% of the group
G1	177	30.7	105	29.2
G2	23	15.2	31	24.8
G3	15	10.0	15	12.8
G4	7	20.0	1	2.4
G5	9	14.5	11	14.9
G6	6	6.4	10	9.5
G7	26	17.4	19	25.0
G8	0	0.0	4	10.8
G9	38	20.8	25	20.3
G10	3	20.0	1	6.7

[a] Only when the holder is the manager of the farm. *Source:* Authors' elaboration.

This lack of positive spill-over effects on the surrounding rural economy, seems to contrast with the environmental implications of the process of adjustment. Indeed, the structural evolution of these farms also had land use implications, with relevant effects in terms of habitat implications. In this regard, the most acknowledged environmental output of this farming system is its ability to serve as habitat for birds –the most relevant is the «great bustard» (*Otis tarda*), which is in danger of extinction and is highly concentrated in Spain (around 50% of world population)[8].

In this sense, the changes of farm structures in Campos would be contributing positively to this environmental function in several ways:

— Firstly, structural adjustment has lead to some crop diversification in this area, since larger farms have diversified crops in order to better distribute the workload throughout the year. This greater crop diversification provides more feeding resources to birds and creates

[8] This relevance gave rise to a specific agri-environmental scheme during the 1990s. The scheme was not updated within the programming period 2000-2006.

more positive conditions for nesting. Census data captured this by assessing a «specialization index»[9] per holding in both 1989 and 1999. Within our study area, the average specialization index went from 0.81 in 1989 to 0.77 in 1999 —a 5% drop. Focusing only on the larger farms (those belonging to G4, G8 and G10), the reduction in the specialization index was 11% in the same period.

— Secondly, the agricultural structures have moved towards more fragmented farms with more and smaller plots (see Fig. 5), as well as non-farmed boundaries and hedgerows, which positively contribute to wildlife habitat.

— Finally, the fewer number of land operations, made possible by direct sowing, has improved the capability of this agricultural system of serving as bird habitat (Palacín *et al.,* 2003).

Hodge (2000) characterizes a case of «output model» of environmental impact of agriculture, i.e. a situation where agricultural production and environmental quality are complementary (rather than competitive as in the «input model»).

Changing farm structures in light of policy reforms

The past process of adjustment brought about a complex scenario which has to incorporate the changes stipulated within the mid term review (MTR). The Spanish Government, in agreement with regional governments, decided to partially decouple the single payment, maintaining 25% linked to production in arable crops. The concern about the risk of massive abandonment in low productivity areas (Campos is an illustrative example) was the main argument to justify this decision (MAPA, 2004).

The lack of updated data prevents the possibility of knowing which has been the structural evolution of farms in the study area from 1999 until 2006 –when the MTR comes into effect in Spain. However, it is possible to compare the different alternative strategies that the farmers would confront in terms of their respective net margins (NM) (assuming the same crop distribution and the same machinery than that of 1999, and for the same farm types). In this sense, farmers would confront three alternative strategies, each one giving a different NM (Table 5):

1. To produce → NM_1 = Market income – Production costs – Land Rent – Amortizations + Coupled payments (25%) + Decoupled payments (75%).
2. Not to produce, which opens two possibilities:

a) To keep the rented land → NM_2 = Decoupled payments for all the farm area – Land Rent.

b) Not to keep (i.e. to release) the rented land → NM_3 = Decoupled payments only for the owned area.

NM_2 and NM_3 should include the costs of fulfilling cross-compliance requirements (Royal Decree 2352/2004; BOE, 2004) needed to get the decoupled payments[10]. However, we have not included such costs because they can range according to several possibilities, since these tasks could be outsourced, or carried out with own machinery —either already amortised or not. In any case, the consideration of the different estimations

Table 5. Net margins (NM) of the alternative scenarios after Mid Term Review[a] (current € 2005)

Farm type	Producing (NM_1)	Not producing	
		Keeping renting (NM_2)	Releasing rented land (NM_3)
G1	**2,469**	1,278	1,278
G2	637	4,249	**4,408**
G3	858	2,551	**3,550**
G4	**41,086**	17,801	19,605
G5	**14,249**	11,254	11,432
G6	**3,225**	–1,361	3,021
G7	–2,247	–48	**1,494**
G8	**24,276**	–2,670	7,108
G9	–5,069	–1,712	**113**
G10	**114,781**	57,771	59,079

[a] The most profitable option for each farm type is indicated in bold. *Source:* Authors' elaboration.

[9] This index is defined as:

$$D_j = 1 - \frac{\left(\sum_i X_{ij}\right)^2}{h} \cdot \sum_i X_{ij}^2$$

where X_{ij} is the surface devoted to the crop i in the holding j, and h the number of arable crops considered. This index ranges between 0 and 1, growing as the specialization does.

[10] In the case of NM_1, it is considered that cross-compliance does not represent additional costs.

of cross-compliance costs does not alter the conclusions drawn from Table 5.

Two main ideas could be extracted from this table. On the one hand, results do not seem to indicate a risk of massive abandonment of farming activity in the study area, since only for medium farms are the net margins linked to activity lower than those farms that stop cultivating[11]. Consequently, in spite of the new scenario of MTR, one should not expect a change in short-term strategies of those holdings involved in expansion.

On the other hand, although it is not a generalised situation, not to produce —which means to receive only the 75% of CAP payments— is indeed the most profitable option for certain farms (G2, G3, G7 and G9). In these cases, farms will opt to release the land they had under tenancy agreements, since $NM_3 > NM_2$. Such a situation will fuel the development of two parallel markets:

— One market of land without payment entitlements. Since tenants generated payment entitlements during the reference period (2000-2002), they become the holders of the entitlements. So if a tenant releases the rented land, the landowner will recover it without any payment entitlement.

— One market of entitlements without land. MTR regulation allows entitlement holders who have no eligible land to maintain these entitlements up to a maximum of three years. Once that period has passed, holders will lose those entitlements that have not been activated (i.e. associated to eligible land). This will mean that entitlement holders who do not want to get land will sell their entitlements, as allowed by the European regulation.

Who will make up the demand for these parallel markets? Perhaps the same farmers involved in the expansion strategies. These farmers will continue demanding new land so as to take advantage of the economies of scale in new technological packages, and they will try to buy payment entitlements so as to increase the profitability of that land.

Conclusions

In Spanish inland arable crop systems, the agricultural adjustment, which had already begun in earlier decades, accelerated during the 1990s. Many professional farmers worked to overcome the price/cost squeeze —the main driving force of the adjustment- by searching for economies of scale linked to new technological packages. In this sense, direct payments transitorily facilitated the investment in fixed capital during the first years of 1992 CAP reform. The analysis has also shown how this new CAP finally brought down per hectare margins, and reinforced the necessity for farm resizing for many holders. However, the enlargement of professional farms has been supported by a financial and institutional situation (low margins and high percentage of rented land) that threatens the stability of this agricultural system in the light of the recent CAP reforms.

Some interesting conclusions can be drawn regarding the nature of structural adjustment. The demographic factor has traditionally played a decisive role as one of the main driving forces of the process. Indeed, an aged population of farmers usually increases the rate of adjustment, since retiring holders supply land for growing farms. In addition, the reduction of farm economic margins accelerates this trend. With this in mind, results show two main issues.

First, the retirement process is usually gradual, as Potter and Lobley (1996a) claim. In our case study, holders leaving the activity begin some years before, not re-investing in machinery and gradually releasing the land that they managed (first the rented and later the owned land). In some cases, throughout this retiring period, holders resort to outsource some tasks. However, the releasing of owned land is affected by the economic and institutional context. Hence, CAP reforms affect the way in which the land of retiring holders (and even their heirs) is finally released, i.e. which tenancy regime is chosen to put the land on the market.

Second, demographic and economic factors do not sufficiently explain the magnitude of the adjustment (similar conclusions are reached by Arnalte and Estruch, 2001). The process is only triggered if farmers who undertake expansionary strategies exert enough pressure. If this additional condition is not fulfilled, economically unviable farms with aged holders will be abandoned, but probably continue formally (and statistically) existing. As indicated by López-Iglesias (2003), one of the most meaningful differential elements of Spanish structural adjustment during the 1990s was the rise of land mobilisation, i.e. the massive transfer of land among farms in comparison to earlier periods.

[11] This conclusion would be also valid assuming full decoupling.

The evolution of farm structures continues responding mainly to the adaptation to economic signals (from both markets and policies) that farmers receive at the sectoral level. Moreover, structural adjustment is also contributing to weaken the linkage between agriculture and the rural society[12]. Indeed, a growing part of the control over resources and factor remuneration are diverted towards urban areas due to (i) residential movements of both part-time and full-time farmers towards cities, and (ii) the diffusion of land rentals mainly by urban owners. This has a noteworthy policy implication: agriculture would be decreasing its capacity to contribute to rural development. This scenario casts doubt as to the capacity of the policies aimed to remunerate the «other» functions of agriculture (e.g. agri-environmental due to the undeniable habitat function of these farms) to serve as appropriate instruments for economic rural development.

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[12] See Baptista (2003) for a discussion on the concept of «dissociation».

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