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Rural migration and agricultural modernization. An analysis of provincial Spain during its great rural exodus, 1960–1981

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KEYWORDS: **Agricultural modernization, rural exodus, Spain, Francoism.**

JEL CODES: **J61, N34, N44, N54.**

Rural exodus in Spain reached its peak in the period between 1960 and 1980. At this time, the Spanish countryside also witnessed its greatest agricultural transformation. Not coincidentally, the end of traditional agriculture and the massive shift of the rural population into industry and services were two major points of the Franco regime's economic development strategy. In any event, the rate of agricultural modernization in Spain by about 1960 presented substantial differences among the country's provinces that were to be most affected by both depopulation and de-agrarianization processes. This work analyses the influence of degree of initial agricultural modernization, through several key agricultural features (motorization, irrigation, land consolidation and yields, among others), on the net rural migration rates at provincial level, during the period 1960-1980. The results point to differences in the impact of these variables between the two decades under study, as well as the importance of preceding migration trends.

Emigración y modernización agrícola. Un análisis de la España provincial durante su gran éxodo rural, 1960-1981

PALABRAS CLAVE: **Modernización agraria, éxodo rural, España, franquismo.**

CÓDIGOS JEL: **J61, N34, N44, N54.**

El éxodo rural en España alcanzó su punto álgido en el periodo comprendido entre 1960 y 1980. En esta época, el campo español también fue testigo de su mayor transformación agrícola. No es casualidad que el fin de la agricultura tradicional y el desplazamiento masivo de la población rural hacia la industria y los servicios fueran dos puntos importantes de la estrategia de desarrollo económico del régimen franquista. En cualquier caso, el ritmo de modernización agraria en España hacia 1960 presentaba diferencias sustanciales entre las provincias del país que se verían más afectadas por los procesos de despoblación y desagrarización. En este trabajo se analiza la influencia del grado de modernización agraria inicial, a través de varios rasgos agrarios clave (motorización, regadío, concentración parcelaria y rendimientos, entre otros), sobre las tasas netas de migración rural a nivel provincial, durante el período 1960-1980. Los resultados señalan diferencias en el impacto de estas variables entre las dos décadas a estudio, así como la importancia de las tendencias migratorias precedentes.

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1. INTRODUCTION

The link between rural out-migration and agricultural change, with all its economic implications, cannot have a better field of analysis in Spain than the period between 1960 and 1980, when contemporary Spanish rural society underwent its most profound economic restructuring. This process was the result of the rapid transformation in production systems and society experienced by the country. Owing to its relevance, perhaps the most outstanding aspect of that restructuring was the massive migratory flow of people away from the countryside, with a figure of some two million people in the decade prior to 1970 alone. Closely linked to the migratory process was the fact that the then largest employer in rural Spain, agriculture, was undergoing a rapid process of modernization that would lead to the demise of the traditional model. As part of the Franco regime's economic development strategy of *desarrollismo* (developmentalism), which emphasized industrialization and urbanization, the agricultural policies put into place over the course of those decades spurred deagrarianization processes in the Spanish countryside.

The enormous force exerted by industrial and urban pull factors over rural Spain during that period has favoured an economic and historiographical interpretation that stresses the impact of rural migration over the transformation of Spanish agriculture, in accordance with the induced innovation hypothesis (Naredo, 2004). Nevertheless, such an explanation overlooks the fact that rural out-migration, as well as agricultural modernization, was a spatially uneven process in Spain. While rural depopulation was a long and gradual process in some provinces, excess agricultural population was drastically and rapidly reduced in others. These spatial disparities are perhaps not sufficiently weighted as to include them in the explanatory logic for the out-migration from the Spanish countryside as a whole, which was determined by the enormous economic, social and cultural magnets that were the city, industry and services. In fact, the rural penalty, the opportunity cost of living in rural areas, also affected places where earlier agricultural modernization had taken place and even the most productive farmers (Collantes & Pinilla, 2011: 86-7). But given that rural out-migration in Spain particularly involved areas that were all predominantly agricultural in the lead up to 1960 (Collantes, 2007), the varying degrees of agricultural modernization at the start of the period encompassing the 1960s and 1970s may be a factor of influence behind the differences between provinces in relation to the Spanish rural exodus.

This paper studies the possible influence of initial agricultural conditions over rural migration/depopulation in Spain during the 1960-80 period, chosen because it was a time when both the huge rural exodus and the greatest process of the structural transformation in Spanish agriculture coincided. Given the great diversity in the types of agriculture

practised in Spain at the time, our analysis focuses on the differences at the provincial level in rural net migration rates during the process of mass agricultural modernization of the countryside. We selected all the Spanish provinces for the 1960s and 1970s. Given that a specific initial agricultural configuration may have deepened or moderated the intensity of the push effect without being able to act as a migratory pull factor, as some works have shown (Paluzie *et al.*, 2009), consideration was only given to factors of influence at origin, leaving aside any variables related to a pull effect on rural migration such as wage differences, or distances to important cities.

The independent variables included in our analysis responded to strictly economic factors, although our analysis of these migrations highlighted the fact that the phenomenon could not be explained from a purely economic perspective after 1970 owing to the influence of other factors of a social and cultural nature (Ródenas, 2008). In this case, the income gap gave way to facilities and amenities in the explanation of internal emigration in Spain (Bentolila & Dolado, 1991; Bentolila & Blanchard, 1990). Given the difficulty posed by introducing variables not precisely related to the direct or indirect influence of the agricultural sector (such as the difference between education and health care provision or culture and leisure amenities in the countryside and urban areas)[1] we incorporated, at least as a control variable, the migration rate of the preceding decade, which indirectly includes the effect produced by the previously established chain migration processes.

On the other hand, the definition of *rural* for the purposes of our analysis is based on the two first meanings proposed by Falk and Lyson (2007), *i.e.* agrarian occupational specialization and low population density. As it is closely associated with the description provided in the previous paragraph, this definition facilitates econometric contrast.

The main hypothesis of this paper is that a set of key agricultural features may have exerted some influence on the different pace and intensity of the rural migration in Spain between 1960 and 1980, inducing a differential type of displacement effect. In order to conduct our analysis in this regard, we first reviewed the literature concerning migrations and agricultural modernization in Spain. Specifically, the literature dealing with the transformation of Spanish agriculture enabled us to select those agricultural features that were related to modernization, which we subsequently turned into variables. These vari-

1. Some important variables were excluded owing to the lack of reliable data. The availability of basic services and facilities such as education or health care, or the provision of cultural and leisure amenities presented special difficulties as they did not differentiate between rural and provincial settings, or only did so for one of the two decades (v.gr., the number of doctors in 1960).

ables, together with other control variables, were used in the regressions performed in order to observe the possible impact of every specific agricultural feature on the rural outmigration rate.

2. BACKGROUND: RURAL EXODUS AND DEAGRARIANIZATION IN SPAIN, 1860-1960

In the two decades following the Second World War, France (Béteille, 1981; Couplex, 2022), Italy (Federico, 2011; Stefano de Rubertis, 2022), and Spain lost more of their rural population than in any previous or subsequent period. The migratory phenomenon commenced just as both Italy and Spain had reached their historical peak rural populations as the result of demographic transition in rural economies in which agricultural activities were still predominant (Collantes & Pinilla, 2011). Therefore, it is logical that the rural exodus should coincide with the intense process of deagrarianization taking place in the 1950s. In Europe as a whole, the 66.2 million people dedicated to agriculture in 1950 were reduced to 40.8 million by 1970 (Federico, 2011: 52). In Italy, the agricultural workforce fell from 8.6 million in 1950 to 3.8 million by 1972. In Spain, the agrarian population was reduced from roughly 50% in 1950 to 25% by 1970, and the active agrarian population fell from 4.9 million in 1950 to 3.5 million by 1972, and only 2.5 million by 1982 (Martín-Retortillo & Pinilla, 2015: 147).

The historical interpretations given to the Spanish migratory phenomenon seem to take into consideration a differentiation between emigration and exodus, for which 1950 marks an important turning point. The abandonment of the Spanish countryside in the early part of the 20th century is largely explained by push factors, mainly due to the relative weakness of pull factors. In this light, the agricultural crisis of the late 19th century would have contributed to the emigration of Spaniards to the Americas (Sánchez Alonso, 2010). In that same period, greater demographic pressure in the Spanish countryside together with a crisis in non-farm rural activities would have influenced rural emigration (Erdozain & Mikelarena, 1997). Moreover, the explanation given for the migratory flows of the first three decades of the 20th century continued to add such agrarian factors as land ownership structure and low agricultural productivity to the effect of polarized industrial growth in Spain (Mikelarena, 1993; Sánchez Alonso; 2010: 140). Spanish rural migration patterns were still those of an essentially non-industrialized country where emigration was one response among others (diversification of income, land under crops) to the imbalance between population and resources (Reher, 1988: 147). Even so, the pull effect did finally appear to predominate in the explanation for internal migrations in Spain also before the civil war of 1936 (Silvestre, 2002, 2005a, 2005b).

The 1950s marked a break between agriculture and the rural economy, with traditional productive structures being insufficient to stem the depopulation of the Spanish countryside (Collantes, 2007: 257). But since the general process of rural exodus did not surge in Spain until the 1960s, agricultural factors such as the proliferation and dispersion of farm holdings (Douglass, 1975; Reher, 1988: 254), farm acreage (Leal *et al.*, 1975) and the concentration of land ownership in southern Spain (Domínguez Martín, 2002) still appear in the explanations for out-migration in the 1950s. Among these factors, the incorporation of labour-saving machinery is the most widely mentioned. The increase in opportunity cost for a style of agriculture that was still highly labour-intensive would mainly have affected low-productivity farms (Collantes & Pinilla, 2011: 77). Whatever the case, the introduction of tractors and combine harvesters does seem to have been a clear push factor for the many farm labourers who earned a living from seasonal work.

In any case, the inevitability of the migratory process after 1960 is based on the fact that not even places where there had been early agricultural modernization could avoid a rural penalty (Collantes & Pinilla, 2011: 86-7). Consequently, the relative privation of farmers compared to the situation in other economic sectors was a key factor behind Spanish emigration in the 1950s and 1960s (Sánchez Alonso, 2010: 147). This privation would extend from a part (agriculture) to the whole (rural setting), as a survey taken in thousands of rural municipalities in 1958 would show. The "desire to live in the city" was the cause for migration most commonly repeated by those surveyed, followed at a considerable distance by the "desire for economic betterment" and "lack or scarcity of work". On the contrary, different agricultural factors (mechanization, lack of resources for production, low returns) have a weighting of only 14% in the list of causes (Borregón, 1960). Be that as it may, the crisis in the traditional agrarian model also contributed to widening the gap between the perception of the rural world and the urban world, accelerating the migratory process (Pérez Díaz, 1969).

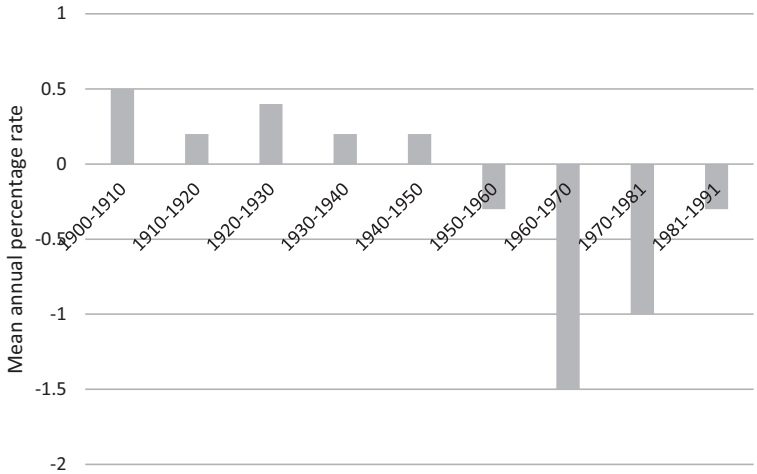
The agrarian policy enacted by the Franco government played a part in the strong reduction of the size of the agricultural sector, which was still the main occupational sector in rural Spain by 1960. A technical reform of the Spanish countryside had been implemented beginning in the early 1950s that was directly inspired by the American Agriculture Extension Program, which was based on increasing productivity through greater capital investment in farms[2]. Consequently, the different measures to encourage direct land ownership and promote irrigation in specific areas, which ranged from the land consolidation policy begun in 1952 to the government regulation of the tractor supply in

2. The Servicio de Extensión Agraria (Agrarian Extension Service) in Spain, created in 1955, was even directly advised by American experts from 1956 onwards (Gómez Benito, 1995: 209).

the late 1950s, greatly hindered the continuity of small-scale farming. The catchphrase of "fewer farmers and better agriculture" coined by Rafael Cavestany, the Minister of Agriculture in 1955, aptly expressed the connection established between agrarian transformation and abandonment of agricultural activity.

Rural exodus and the decline in the active agricultural population reached its peak in the 1960s. Unlike in the preceding decade, the agricultural population declined in all Spanish regions without exception, leading to the loss of a total of 1.7 million agrarian jobs (García Barbancho, 1975: 84). The pace of rural abandonment abated in the 1970s, but the dismantling of the traditional rural and agrarian societies continued. Given that rural exodus, unlike simple migration, involves a net decline in the rural population, the analysis of growth rates for the rural population between Spanish censuses highlights the magnitude of this decline during the 1960s and 1970s.

FIGURE 1
Variation in the rural population of Spain, 1900-91



Source: own elaboration based on data compiled by Collantes and Pinilla (2011: 28).

Considered part of the dynamics of internal migration, 1960s rural depopulation has traditionally been understood from the logic of two sectors (Harris & Todaro, 1970), those being rural areas in general, and agriculture in particular, both passive bystanders to the migratory process. This view was actually already prevalent in the 1960s. Since then, the casting of roles has also been applied spatially, so that the displacement between mainly rural and agricultural provinces (passive) to others with a great urban and industrial pull (active) has been positively associated with the divergence in income levels, wages and job opportunities, and negatively with travelling costs (García Ferrer, 1979; Santillana, 1985;

Bentolila & Dolado, 1991; Ródenas, 1994). The huge loss of significance experienced by the Spanish agricultural sector in terms of GNP and employment since 1960 (the latter had already been reduced to 10.3% at the end of the 1980s) has undoubtedly contributed to the supremacy of the pull factors and the insignificant influence of the role played by agriculture in historiographical explanations.

In any event, recent studies conclude that agricultural growth had neither the potential nor the capacity to retain population in the Spanish countryside. Despite the modernization process, Spanish agriculture never stopped displacing population to the other productive sectors. And although agricultural production grew, the greatest increase in employment and value-added brought about by the food industry mainly took place in urban settings. In short, the great productive change that agricultural modernization represented could not prevent migration to the city from being understood as the best way to achieve higher levels of income, consumption and access to basic services (Collantes & Pinilla, 2019). Ultimately, the idea that agricultural modernization through enlargement of scale, specialization and mechanization could foster rural prosperity ceased to be considered valid (Rivera *et al.*, 2018). However, that idea, along with the industrialization of the countryside, was seen as the best solution for rural depopulation in Spain in the 1960s (see Paniagua, 2016).

From the mid-1950s on, rural exodus played a major role in Spanish economic development, but its magnitude exceeded all the Franco regime's expectations, to the point of threatening the main role agriculture had to fulfil (García Badell, 1965). Indeed, efficiency in the agrarian sector was key to supplying cheap food to the growing urban population (Maqueda, 1966). Among other concerns, the dismantling of agriculture had already begun to pose a problem for the country's development process by the late sixties. But given that deagrarianization ran parallel to the degree of rural depopulation, the magnitude of this problem was uneven in geographical terms. The differences in migratory intensity showed diverse effects on a spatial level, including labour shortages and increasing rural ageing. In the aftermath of the Franco regime, the previous developmental strategy began to be questioned, although only by a minority (Paniagua, 2016).

Thus, the relatively minor role of agriculture in the overall explanation for those migratory processes needs to be clarified when analysing the spatial differences seen in the Spanish rural exodus. In fact, the importance that new economic geography gives to market size in migratory flows shows a marked displacement effect for the agricultural sector in 1960s Spain (Paluzie *et al.*, 2009). Regions where agriculture had enjoyed a greater weighting were more intensely affected by emigration, an aspect that is coherent with the rather uneven agricultural map in which a number of areas had already been los-

ing farmers over time, while others maintained an overly large number of farmers in a very traditional agrarian setting. The "technical" agrarian reform undertaken by the Franco regime, starting in the early 1950s, was a factor to be considered throughout this entire process (Gómez Benito, 1995). Encouraging direct farming by landowners and measuring the viability of farms according to their efficiency led to the introduction of spatial differences in the mobility of the agricultural population. The concept of relative deprivation would have affected the Spanish agricultural sector during the 1950s and 1960s (Sánchez Alonso, 2010: 142), with this being more intense in those traditional areas where access for landless labourers to land ownership had been an important political and social issue.

The question should therefore be asked of whether the different configuration of agricultural systems over which the urban agglomerations exerted their irresistible pull, and over which non-democratic political decisions had an impact, had a bearing on the greater or lesser degree of rural abandonment. This issued is dealt with in the following sections.

3. ANALYSIS OF RURAL MIGRATION IN THE PROVINCES OF SPAIN, 1960-80

After defining our sample period, the first step in investigating the possible impact of agricultural modernization on the rural exodus consisted of analysing the provincial outflow of population from the Spanish countryside. Given its close connection with production and agricultural employment, the scope was the number of rural inhabitants, not the provincial total. We consider rural inhabitants to be the population of municipalities with fewer than 10,000 inhabitants. This threshold is that used by the main social science studies on the rural population of Spain in the 20th century, although it is by no means perfect, given the disparities between Spanish regions (see Collantes & Pinilla, 2011, Chapter 1). Considering the likely statistical problems associated with migratory flows during the period of study, we adjusted our calculations for the rural setting to provide as homogeneous a sample of municipalities as possible for the two decades in question[3]. Finally, in the study of the variation in the rural population, it was important to differentiate the loss attributed to migration from that corresponding to natural population change

3. In order to avoid the inclusion of municipalities that start off with a population of less than 10,000 at the outset of the first decade and having to exclude them if they were to exceed this figure in the second decade, the same municipalities were introduced at both dates of each decade provided that: a) the municipality had a population of under 10,000 at the outset, and b) the municipality did not exceed a population of 15,000 in the last year. As a result, only those municipalities that clearly surpassed the definition or *rural* at any time were excluded from the sample.

by means of rural migratory balances[4]. In order to calculate these balances, the method used by García Barbancho (1975) was applied[5].

Once rural migratory balances were obtained, we calculated net rural migration rates, a percentage obtained through the ratio between the rural migratory balance and the average of initial and final de facto rural population taken from the *censos de población* for each province with data collected by the National Statistics Institute of Spain (INE, 1966, 1975). Because 39 and 31 of the 50 Spanish provinces in the 1960s and 1970s, respectively, had negative net migratory rates (Appendix: Table A1[6]), the results are highly informative of the degree to which the characteristics of the agriculture practised in each one of them might have influenced the so-called rural exodus.

The calculation of both migratory balances and rural migration rates (MRs) for the decades 1960-70 and 1970-80 enabled differentiation between provinces with a net rural population decrease (negative MR) and those that attracted immigrants (Table A1). In addition, the provinces that lost rural population were mostly agricultural: the average proportion of Agricultural Active Population (AAP) taken from the INE was 54.9% in 1960 (37 provinces) and 45.5% in 1970 (31 provinces) (Table A1). If we observe the percentage of Agricultural Employees (AE) given by another source (Banco de Bilbao, 1978), the conclusion is quite similar: in the provinces with net migration, 52.7% on average were occupied in agriculture in 1960, and a 47.3% in 1970.

The map of Spanish net rural migration in the 1960s highlights the drier inland provinces of agrarian regions such as Castile, Andalusia and Extremadura as having the highest levels of rural exodus, whereas the provinces with positive migratory balances joined those that were undergoing rapid industrialization during the period of study (Barcelona, Madrid and the Basque provinces) and those where the development of tourism was taking place, both on the Mediterranean coast and island regions (Fig. 2). The negative migratory balance was particularly pronounced in the two regions that underwent a more intense depopulation process during the period as a whole: the mountainous provinces located within the Iberian System and all the inland provinces bordering

4. Another possibility by which to elaborate migration rates would be by means of the *Encuesta de Variaciones Residenciales* (statistics recording changes in residence over the decades), but this method does not account for the Spanish migration abroad until 1980. Given that thousands of Spaniards were still leaving the country in the 1960s to work in other European countries, this source could underestimate mobility in many provinces.

5. Final year de facto population-Initial year de facto population-Natural population growth (births, deaths).

6. See https://doi.org/10.26882/histagrar.090x07c

Portugal. In general terms, the weighting of agriculture in these areas was strong. What is more, the provinces with the worst demographic dynamics still represented the traditional agricultural model in 1960, since all but one of the 17 were labour intensive[7].

FIGURE 2
Rates of rural exodus by province, 1961-70

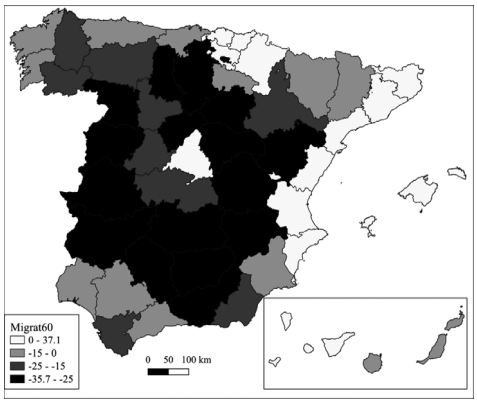
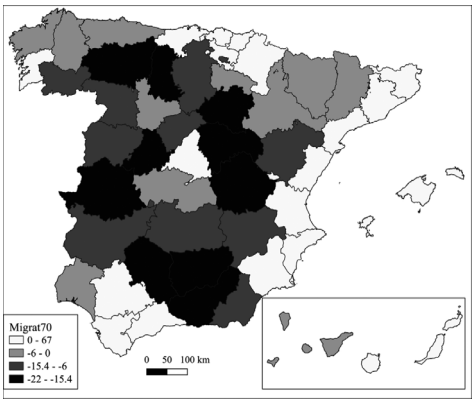


FIGURE 3
Rates of rural exodus by province, 1971-81



Source: own elaboration based on the results of Table A1.

The migratory pattern shown for the 1970s highlights the same regions as in the previous decade, both in the case of the provinces with positive migration rates, and in the case of rural out-migration, although with significantly lower percentages in relation to the 1960s (Fig. 3). Out of the 17 provinces with the greatest loss of rural population in the 1961-70 period, 15 reappear at the top of the list for 1971-81. After the main decade of agricultural modernization in Spain, nearly all these provinces still showed the characteristics of more traditional agriculture. For example, in the face of an intense crop reorientation, wheat remained a major output in those provinces; and in the technological context of the Green Revolution of those decades, yields from their land were still among the lowest in all Spanish agriculture.

4. MAIN FEATURES OF AGRICULTURAL MODERNIZATION IN SPAIN, 1960-80

Once we obtained the net rural migration rates for the Spanish provinces in the third quarter of the 20th century, we needed to identify the explanatory variables, defined as those

7. In fact, only Valladolid shows a percentage of agricultural active population (AAP) below 50% (Table A1).

measuring the agricultural features that typically marked the modernization of Spanish agriculture during that period (Clar, Martín-Retortillo & Pinilla, 2018). Both the works on the Spanish agriculture of the time that are now considered classic (Naredo, 2004, first published in 1971; Leal *et al.*, 1975; Abad & Naredo, 2002) and those with a more spatially reduced scope (Díez Modino & Tascón, 1988) allowed us to identify the main factors affected by the agricultural transformation. Specifically:

a) Changes to farm acreage as a result of new technical developments and economies of scale. In fact, the INE agricultural censuses showed an increase in average farm acreage in Spain between 1962 and 1982 (from 15.5 to 18.9 hectares).

b) Reduction in the fragmented nature of farms as a complement to the average increase in the size of agricultural enterprises. The agricultural censuses showed that the number of land parcels or plots per farm actually decreased in Spain between 1962 and 1982 (from 13.7 to 8.7).

c) Significant incorporation of fertilizers and pesticides which, combined later with biological improvements resulting from the Green Revolution (high yielding seeds), greatly improved yields. The agricultural gross value added/agricultural land area ratio in Spain increased between the early 1960s and the early 1980s (from 4,039 pesetas/hectare to 4,823).

d) Strong increase in capital investment per farm, particularly for the introduction of agricultural machinery, improving labour productivity. For example, the mechanization of the Spanish countryside increased greatly between the early 1960s and the early 1980s, and so did the output per agricultural employee (from 29,731 pesetas to 90,433).

e) Intense expansion of irrigation systems, associated with large-scale dam building. This was one of the highlights of Spanish agriculture during that period, as the average land area under irrigation increased in Spain according to the agricultural censuses for the 1962-82 period (from 2.034 million hectares to 2.681 million).

f) Reorientation of farming towards goods with greater income elasticity of demand, such as livestock-based products and fresh fruit and vegetables, coexisting with the retreat of the cereal-based agriculture. Within this generalized trend, wheat –the main commodity produced in the Spanish countryside– was

the crop most affected (in terms of value, wheat accounted for 10.7% of all the Spanish farm output for the 1961-65 period; twenty years later, it had declined to 4.9%), with farms and people caught up in its wake.

g) Reduction in the number of agricultural labourers in the Spanish countryside (from 1,614,000 to 760,400 between 1960 and 1980). This is due to the fact that most of landowners opting for direct exploitation of their lands, and to the growing phenomenon of part-time agriculture, together with the decrease in the demand for labour to perform agricultural tasks due to mechanization.

Consequently, we specified seven key variables of agricultural modernization to measure their possible influence over the provincial net rural migration rates (see Appendix, Table 2A):

a) *Acreage:* provincial average farm acreage. This was calculated from the total land acreage and the number of farms present in the INE agricultural censuses (1962 and 1972). In general terms, new agricultural developments required growing investment (particularly in machinery), which in turn required farms of a larger size. In fact, the surface area under cultivation in Spain grew between 1965 and 1975 (Camarero, 2017: 168, 170).

b) *Plots:* average number of parcels per farm. This was calculated from data compiled in the INE agricultural censuses (1962 and 1972). It is worthy of mention that in the 1982 Spanish Agrarian Census –representing the end of the period studied in this paper– the crops with the fewest number of plots per farm were the most intensively cultivated and with the highest value (olives, vegetables, fruit trees and citrus), three times fewer plots than for of cereal and root crops, so-called "general agriculture" (Ruiz Maya, 2007: 214).

c) *Yields:* 1000 pesetas product/hectare. Yields were calculated using the provincial statistics for agricultural production compiled by the Ministry of Agriculture in the 1960s in its Anuario de Estadística Agraria (Agriculture Statistics Yearbook), divided by the total surface occupied in each province by the crop groups studies. Because this direct system of calculation was not available for the 1970s, the production of the same crop groups was evaluated using provincial prices in 1961 with production statistics from the Anuario de Estadística Agraria for 1970. The cultivated surface areas for each province were obtained from the same source as the sum of herbaceous and woody plant crops. The adoption of the agrarian extension programme by the Franco government in

the 1950s became the main source of the technology that enabled the Green Revolution to take place in Spain, boosted by the strong economic growth shown by the country since 1959 (Fernández Prieto, 2009). Inputs such as fertilizers were combined with the expansion of land under irrigation as part of a productivist strategy focusing on increasing crop yields.

d) *Motorization*[8]*:* horsepower for every thousand/hundred hectares of cultivated land. For the 1960s, we obtained horsepower data from the INE agricultural machinery censuses, while statistics for cultivated lands (1,000 hectares) were taken from the INE agricultural censuses. The statistics for the 1970s (horsepower per 100 cropped hectares) are taken directly from the Means of Production section of the Anuario de Estadística Agraria for 1973. From 1955 to 1979 tractors in Spain experienced a strong increase in horsepower. Greater productivity associated with this agricultural motorization meant lower workforce requirements (Arias, 2000: 18, 24). And given that the margin for the technical modernization of crops was greater for products such as those predominantly grown in Spain (grain crops), higher degrees of motorization would imply that less labour was required.

e) *Irrigation:* percentage of irrigated land from the total of agricultural land. This was calculated using data from the INE agricultural censuses of 1962 and 1972. There is no doubt that the extension of irrigation was key to the process of agricultural modernization, both by enhancing the effect of fertilizers and improved seed varieties resulting from the Green Revolution and by introducing crops destined for the production of animal feed (maize and alfalfa).

f) *Wheat:* proportion of wheat over total agricultural production. The figures for the 1960s were obtained directly from the assessment made by the Ministry of Agriculture in the different editions of the Anuario de Estadística Agraria published for 1961, 1962 and 1963. Because this assessment was not available for the following decade, the 1970s figures were estimated by taking the agricultural production of each province, according to the Anuario de Estadística Agraria for 1970, and comparing it with the prices provided in the same yearbook for 1961. Winter cereals, particularly wheat, suffered severely during the shift from traditional to modern agriculture. Firstly, food grains, namely wheat,

8. The composition of agricultural machinery in our calculations includes tractors, reapers and harvesters, but also motor and/or engine-driven irrigation pump motors and other motors and engines serving different purposes. We use the term *motorization* rather than *mechanization* for this reason.

gave way to feed grains, such as barley and maize, partly stimulated by the shift in cereal price policy during the second half of the 1960s (Camarero, 2017; Clar, 2005). Secondly, the thresholds of working animal replacement by machinery for the 1960s indicated that winter grains such as wheat, especially in dryland farming areas, were those most affected by mechanization in the 1960s (Naredo, 2004: 182-83, 192).

g) *Labourers:* percentage of labourers in the total agricultural workforce. This was calculated from data compiled in the Banco de Bilbao statistics yearbooks (1973, 1983). The policies of the Franco regime discriminated against labourers from the very beginning, with the banning of trade unions. In the context of a surplus rural labour force, especially in the south, growing opportunities inside and outside Spain from 1955 onwards mostly affected agricultural labourers, given that they had the lowest income and that they were employed on a seasonal basis. Nevertheless, it was also true at that time that many labourers from poor rural areas were less mobile than family employment involved in agriculture. In fact, the proportion of labourers in the total Spanish agricultural workforce remained stable at around 35% from 1955 to 1980 (Camarero, 2017: 178).

We selected these seven explanatory variables for the econometric analysis, the data for all of which corresponded to the beginning of each decade (1960, 1961 or 1962, and 1970, 1971 or 1972, depending on the variable), given that we aimed to explore which (and to what extent) initial agricultural characteristics had been able to influence the net rural migration rate for each of the two decades (1960-70, and 1970-81).

We decided that several control variables should also be included in the econometric model in addition to those considered. Two basic criteria were used in this regard. The first criterion included the factors of population retention or displacement, identified by recent historiography on rural migration. In particular, the work by Paluzie *et al.* (2009: 259) singled out the economic predominance of agriculture as a negative demographic appeal (or displacement) factor for internal migrations in 1960s Spain. According to those authors, a greater relative weight for the agricultural sector in a province should be an incentive to leave. Even today, higher shares of population employed in agriculture show a significant negative association with areas of low population density in Spain (Gutiérrez *et al.*, 2020). As some provinces were mostly agricultural both in terms of employment and output, it seemed interesting to incorporate this variable into the regressions.

h) *Marketsize* was obtained as a ratio of the agricultural gross value-added to the total value-added for each province using data compiled in the BBVA statistics.

The second criterion considered to what degree migration rates may have their own dynamics that were strongly related to the existence of prior migratory origins, reproducing migratory flows over time. Given that the internal migratory flows that had been severely disrupted by the Spanish Civil War and the difficult early post-war years of the 1940s were resumed in the 1950s, the net migration rate for the decade immediately preceding each period of study was included.

i) *MigrateRate_pd:* net migration rate of the previous decade. For the 1960s, the provincial net migration rates used were those for the 1950 calculated by Tamames (1962) (MigrateRate_50). For the 1970s, the provincial net migration rates were that considered as dependent variable in the preceding decade (MigrateRate_60).

Therefore, the full regression took the following form[9]:

$$MigrateRate_i = \beta_1 + \beta_2\, Acreage_i + \beta_3\, Plots_i + \beta_4\, Yield_i + \beta_5\, Motorization_i +$$

$$\beta_6\, Irrigation_i + \beta_7\, Wheat_i + \beta_8\, Labourers_i + \beta_9\, Marketsize_i + \beta_{10}\, MigrateRate\_pd_i + u_i$$

Once we had performed the econometric analysis, we detected which of these agricultural features were important enough to influence provincial net migration rates in rural Spain between 1960 and 1980.

5. METHODS AND RESULTS OF THE ANALYSIS

Several models were estimated for the entire study period of 1960-80 using different combinations of variables and taking into account the possible linear correlation between the different explanatory variables for the net rural migration rate. The highest correlations were found for the variables *Wheat* and *Acreage* (0.60), *Plots* and *Wheat* (0.57), and *Marketsize* and *MigrateRate_pd (0.55)*.

9. All the models are estimated by ordinary least square. Potential endogeneity bias is not considered because all the independent variables refer to the beginning of the period.

TABLE 1

OLS estimations: Dependent variable: Rural net migration rate, 1960-80

	(1)	(2)
const	23.42***	23.41***
	(3.152)	(3.044)
Madrid	25.30*	26.92*
	(13.51)	(14.62)
Labourers	-0.1034**	-0.0980*
	(0.0493)	(0.0499)
Acreage	-0.6332***	-0.5324***
	(0.1605)	(0.1215)
Irrigation	0.4215**	0.4387**
	(0.1931)	(0.1971)
Plots	-0.2953***	-0.2375***
	(0.0890)	(0.0858)
Yield	-0.2707***	-0.2765***
	(0.07821)	(0.0759)
Wheat	0.1338	
	(0.0956)	
Motorization	-0.003013	
	(0.0029)	
Marketsize	-0.5303***	-0.5691***
	(0.0831)	(0.0742)
MigrateRate_pd	0.5054***	0.4289***
	(0.0934)	(0.0743)
N	100	100
Adjusted R^2	0.8200	0.8192
lnL	-339.6	-340.9
RESET	6.3650	13.9260
	[0.0026]	[0.0000]
D-H (Norm.)	1.0495	4.4568
	[0.5917]	[0.1077]
F-Chow	**43.2955**	**38.5189**
	[0.0000]	**[0.0000]**

Notes: standard errors robust to heterocedasticity in round brackets. P-values in square brackets (*** p-values < 0.01;** p-values < 0.05; * p-values < 0.1).

Source: own elaboration based on data from table A2.

Table 1 presents the ordinary least squares (OLS) estimates for the parameters of two models: model (1) with all variables, and model (2) where some of the variables that may have caused serious collinearity in the model or that were not significant were removed. No major problems of multicollinearity were detected in model (2) using the variance inflation factor (VIF) and the Belsey-Kuh-Welsch test (Belsey, Khun & Welsch, 1980). Because an outlier was detected for Madrid, a dummy variable was introduced into both models that tool the value of one when the observation was made for that province, and zero for the rest. Madrid was the only province to attract population while having a net rural migration rate that was much higher in the 1970s than the rate shown in the 1960s.

The lower part of the table presents the values of the RESET test (Ramsey, 1969) for testing correct functional form, the Doornik-Hansen test (D-H Norm.) for testing the hypothesis of normal distribution of the random disturbance (Doornik & Hansen, 2008), and the Chow test for structural stability of the model (Chow, 1960), for each model, together with their corresponding p-values in square brackets. For the normally used levels of significance, the normal distribution hypothesis was not rejected in either model, which allowed us to use the RESET test, which rejected the hypothesis of correct functional form. The Chow test led us to reject the null hypothesis of structural stability between the two decades between 1960 and 1981, for any normally used level of significance (1,5 and 10%), in both models. For this purpose, it was necessary to estimate the models separately for each of the two decades under consideration. The result did not come as a surprise given that the 1960s were the peak period for both rural emigration and agricultural modernization (and its opposite, the crisis in the traditional agrarian model). By the 1970s, agricultural modernization had almost been completed, and so had rural demographic adjustment.

5.1. Econometric analysis for the decade 1960-70

For the decade 1960-70, a high degree of linear correlation was detected between the two control variables: *Marketsize* and the net migration rate for the previous decade, *MigratRate_50,* (-0.83). Important correlation was also detected between other variables that we had considered as possibly determinants of the exodus of population from rural areas, specifically between *Wheat* and *Acreage* (0.76), and between *Plots* and *Wheat* (0.59). For this purpose, several models were estimated with different variables and different functional forms. Table 2 shows the OLS estimates for the models in which important multicollinearity was not detected between the explanatory variables, using both the variance inflation factor (VIF) and Belsey-Kuh-Welsch test. The functional form of these models was considered adequate according to the RESET test and the null hypothesis of ho-

TABLE 2

OLS estimations: Dependent variable: Rural net migration rate, 1960-70

	(1)	(2)	(3)	(4)
const	3.321	**3.203**	29.17***	**29.11*** **
	(4.014)	**(3.535)**	(4.806)	**(4.443)**
Labourers	-0.1118	**-0.1137***	-0.2236***	**-0.2055*** **
	(0.0719)	**(0.0616)**	(0.0716)	**(0.0696)**
Acreage	-0.2201	**-0.2902*** **	0.0845	
	(0.2023)	**(0.1027)**	(0.2096)	
Irrigation	0.9180***	**0.8097*** **	1.409***	**1.453*** **
	(0.3044)	**(0.2676)**	(0.3352)	**(0.3609)**
Plots	-0.1960	**-0.2193** **	-0.2542**	**-0.2784** **
	(0.1205)	**(0.0860)**	(0.1252)	**(0.1153)**
Yield	-0.0149		-0.0992	
	(0.1488)		(0.1602)	
Wheat	-0.0498		-0.2282	**-0.1698** **
	(0.1413)		(0.1453)	**(0.0834)**
Motorization	-0.0043		0.0046	
	(0.0047)		(0.0047)	
MigrateRate_50	1.482***	**1.450*** **		
	(0.1388)	**(0.1097)**		
Marketsize			-2.061***	**-2.064*** **
			(0.3129)	**(0.3419)**
Marketsize²			0.02283***	**0.0229*** **
			(0.0052)	**(0.0056)**
N	50	**50**	50	**50**
Adjusted R^2	0.8559	**0.8619**	0.8443	**0.8493**
lnL	-160.7	**-161.4**	-162.0	**-163.0**
AIC	339.3719	**334.7497**	343.9953	**340.8133**
SBIC	356.5802	**346.2218**	363.1155	**356.1095**
RESET	1.4355	**1.6924**	1.5774	**1.0521**
	[0.2511]	**[0.1964]**	[0.2166]	**[0.3587]**
White	42.0883	**19.6398**	13.4958	**28.4425**
	[0.5539]	**[0.4807]**	[0.7024]	**[0.7365]**
Bresusch & Pagan	3.1848	**2.6306**	8.4011	**6.3975**
	[0.7377]	**[0.7567]**	[0.4943]	**[0.4942]**
D-H (Norm.)	1.1254	**0.5542**	1.9033	**0.6976**
	[0.5695]	**[0.7580]**	[0.3861]	**[0.7055]**

Notes: standard errors in round brackets. P-values in square brackets (*** p-values < 0.01;** p-values < 0.05; * p-values < 0.1).

Source: own elaboration based on data from table A2.

moscedasticity was not rejected using both White's test (White, 1980) and the Breusch-Pagan test (Breusch & Pagan, 1979). Likewise, the hypothesis of normality of residuals was not rejected when several of the normally used tests were applied (the values of the Doornik-Hansen test are in the tables). We highlight in bold type the models selected using different selection criteria such as the adjusted coefficient of determination (R^2 Adj.), the Akaike information criterion (AIC; Akaike, 1974) and Schwarz's Bayesian Information Criterion (SBIC; Schwarz, 1978).

Model (1) contains all the important variables considered in the preceding section, except *Marketsize*, due to the high degree of linear correlation with *MigratRate_50*, while the non-significant variables and/or variables with some important degree of correlation with some of the others were eliminated in model (2). Model (3) contains the same variables as model (2), but *Marketsize* is used instead of *MigratRate_50*. Model (4) includes the variables of model (3) which are significant and with not important lineal correlation with the others. These last two models are non-linear, because the *Marketsize* variable is also squared[10].

Regardless of the model selection criterion used, adjusted coefficient of determination (R^2 Adj.), logarithm of the likelihood function (lnL), AIC and SBIC criteria, the model chosen was model (2), where the estimates of the coefficients of the variables have the expected sign and are significant (*Acreage* and *Irrigation* at 1%, *Plots* at 5%, and *Labourers* at 10%). Nonetheless, the sign of the estimates of the coefficients of each variable were similar in the rest of the models, although some were not significant.

From model (2), we conclude that an increase of one percentage point in the net rural migration rate in the previous decade *(MigratRate_50),* with the remaining variables kept at the same levels, would imply an increase in the net rural migration rate in the 1960s of almost one and a half percentage points (inversely, the higher the rural out-migration rate during the 1950s, the higher it is in the 1960s). In turn, an increase of one percentage point in the irrigated land surface area would increase the rural migration rate in the 1960s by close to 0.8 percentage points. Finally, *Acreage*, *Labourers* and *Plots* had a negative effect, but a much lower impact on the rural migration rate.

From the non-linear model (4), we conclude that an increase of one percentage point in the *Marketsize* variable negatively influenced the net rural migration rate, but the greater the percentage of the gross value added (GVA) of the agrarian-fishing sector over the to-

10. In a previous estimated linear model using this alternative variable, the hypothesis of correct functional form was rejected by the RESET test (Ramsey, 1969).

TABLE 3

OLS estimations: Dependent variable: Rural net migration rate, 1970-80

	(1)	(2)	(3)	(4)
const	1.334	9.5047	25.48**	**36.56*** **
	(3.532)	(2.4804)	(9.423)	**(4.811)**
Madrid	44.33***	**45.53*** **	41.39***	**36.38*** **
	(3.104)	**(2.757)**	(9.281)	**(8.248)**
Las Palmas	20.75***	**20.74*** **		
	(1.229)	**(1.169)**		
Labourers	0.1732***		0.0809	
	(0.0409)		(0.0802)	
Acreage	0.4041		0.3099	
	(0.2460)		(0.3475)	
Irrigation	0.0090	**0.1866**	0.7974***	**0.8856*** **
	(0.1884)	**(0.2117)**	(0.2695)	**(0.2459)**
Plots	0.1651**	**-0.0573**	0.03364	
	(0.0703)	**(0.0774)**	(0.1616)	
Yield	-0.1298	**-0.2001***	-0.0962	
	(0.1122)	**(0.1039)**	(0.1512)	
Wheat	-0.1588**	**-0.0268**	-0.3525***	**-0.2234*** **
	(0.0766)	**(0.0550)**	(0.1208)	**(0.0771)**
Motorization	0.0092		0.05064	
	(0.0304)		(0.0339)	
MigrateRate_60	0.7863***	**0.7489*** **		
	(0.0794)	**(0.0639)**		
Marketsize			-2.928***	**-3.446*** **
			(0.6639)	**(0.5356)**
Marketsize²			0.0516***	**0.0618*** **
			(0.0148)	**(0.0128)**
n	50	**50**	50	**50**
Adjusted R^2	0.9386	**0.9243**	0.8459	**0.8458**
lnL	-136.0	**-143.1**	-159.1	**-162.1**
AIC	294.0946	**302.2828**	340.1332	**336.2143**
SBIC	315.1269	**317.5790**	361.1654	**347.6864**
RESET	0.3354	**0.8522**	0.5609	**0.2426**
	[0.7169]	**[0.4341]**	[0.5745]	**[0.7857]**
White	20.0382	**22.9197**	17.5016	**19.286**
	[0.3307]	**[0.4063]**	[0.4889]	**[0.1543]**
Breusch & Pagan	9.0506	**5,7726**	11.2901	**8.8243**
	[0.5273]	**[0.5665]**	[0.3354]	**[0.1261]**
D-H (Norm.)	0.8311	**0.2030**	1.5200	**0.6922**
	[0.6599]	**[0.9035]**	[0.4677]	**[0.7074]**

Notes: standard errors in round brackets. P-values in square brackets (*** p-values < 0.01;** p-values < 0.05; * p-values < 0.1).

Source: own elaboration based on data from table A2.

tal GVA of a province, the lower this negative effect. The remaining variables had an effect similar to that in model (2).

5.2. Econometric analysis for the decade 1970-81

For the years 1970-81, some of the variables continue to show high linear correlation. Specifically, as in the previous decade, this was the case of *Marketsize* and the net migration rate for the preceding decade, *MigrateRate_60* (-0.80), and of *Wheat* and *Acreage* (0.74). Added to these are *Motorization* and *MigrateRate_60* (0.61), *Wheat* and *MigrateRate_60* (-0.59), *Yield* and *MigrateRate_60* (0.54), and *Wheat* and *Marketsize* (0.51). Also for this decade, several models, with different variables and different functional forms, were estimated. Table 3 shows the model estimates that meet the assumptions necessary for these OLS estimates to be adequate, both as regards the systematic part of the model, correct specification, and the assumptions regarding the random part of the model, such as homoscedasticity and normality.

As in Table 2, the net rural migration rate variable for the previous decade, *MigrateRate_60*, was used in models (1) and (2), and the *Marketsize* variable was used in models (3) and (4), given their high linear correlation between them. The rest of the variables were introduced into models (1) and (3), while a number of them were removed in models (2) and (4), given that they featured serious multicollinearity. Because two outliers were detected for the provinces of Madrid and Las Palmas, in some of the estimated models, two dummy variables were introduced (*Madrid* and *Las Palmas*), which take value one for the observations of each province and zero for the rest, respectively. Their coefficients had high positive values owing to the high power of attraction of exerted by the Spanish capital and the tourism potential of the Canary Islands.

From model (2) it is concluded that the net rural migration rate of the previous decade played an essential role, indicating the persistency of strong migratory streams with regard to the decade of the great Spanish rural exodus. Yields per hectare appeared as the only other minimally significant variable.

The alternative model (4) includes the variable *Marketsize* instead of *MigrationRate_60*, and as for the 1960s, this is not a linear model. The results indicate that an increase of one percentage point in the GVA of the agrarian sector over the total provincial GVA had a more negative influence on the net rural migration rate in the 1970s than was observed in the 1960s. The positive estimation and significance of the coefficient of the squared *Marketsize* variable indicate that this negative influence was smaller the higher

the value of Marketsize. *Irrigation,* with a positive effect on the rural migration rate, although lower than in the 1960s, and the percentage of agricultural production accounted for by *Wheat*, with negative estimated coefficients, were also significant.

6. IMPACT OF SELECTED AGRICULTURAL FEATURES ON NET RURAL MIGRATION RATES

The results obtained from the regressions highlight the influence of certain agricultural variables on the magnitude of the provincial net rural migration rate, which was very significant in the 1960s, although losing importance over the course of the following decade. In turn, these variables were all directly affected by the technical and political restructuring of the Spanish countryside between 1955 and 1980.

Motorization was the only non-significant variable in any model for either of the decades studied. *Yields*, however, was only significant at the lowest level normally considered (10%) in the best regression of the 1970s (model 2). Its negative sign inversely associates yields per surface with the migratory dynamics of that decade. Given the important positive correlation coefficient of the *Yields* variable in the 1970s with net emigration in the 1960s, the provinces with the lowest yields would already have lost a great deal of rural population in the preceding decade. The other agricultural variables are discussed below.

Irrigation. In all cases, this variable had a positive effect on the net rural migration rate, although its influence decreased for the 1970s, and only showed significance in model 4, which included *Marketsize* as the control variable. Already in this period, irrigation appeared as the only variation in land use capable of increasing Spanish agricultural output according to the World Land Reform Conference report of 1966 (see also Martín-Retortillo, Serrano & Cazcarro, 2020). Before and during that time, the link between irrigation and agricultural profitability was well established in Spain (Duarte, Pinilla & Serrano, 2016), and the availability of irrigation as a brake to rural depopulation was about to become a recurring discourse. The "retention" effect of irrigation found in the regressions coincides with the best demographic results shown by municipalities with irrigation compared to dryland farming municipalities in two provinces in the Ebro Basin throughout the entire 20th century. A larger initial area of land under irrigation made agricultural modernization easier, and though rural exodus could not be avoided in most cases, a difference could be seen between irrigated farming areas and dryland farming areas (Silvestre & Clar, 2010). In turn, the economic effect of irrigation affected other variables included in our analysis. In fact, land parcel amalgamation and the increase in average cultivated area took place with greater intensity on irrigated land (Ruiz Maya 1977; Mata, 1997).

Plots. This variable was significant in the two regressions performed for the 1960s, and only ceased to be significant in the 1970s. Its negative sign meant that the higher average number of plots that made up a farm in a province, the lower net rural migration rates. Fragmentation of land parcels was one of the main concerns of the agricultural modernization, given that a small, fragmented farm could not take advantage of the effects of scale brought about by mechanization and irrigation, reducing its profitability. The implementation in 1952 of a policy for land consolidation, voluntary at the start but soon becoming obligatory, meant considerable pressure was exerted on many farmers. In 1966, the above-mentioned report on Spain by the World Land Reform Conference focused on the existence of highly fragmented and disperse land parcels, together with the absence of capital, as one of the main drawbacks for the reform of agrarian structures, as Reher (1988) explained in the case of the La Mancha region.

Acreage. This variable only appears to be significant in the best regression for the 1960s (2). Its positive sign indicates that acreage was inversely associated with net migration rates. The result of both the land consolidation policy and the changes in the market for lands derived from the transformation of the countryside was an increase in the average cultivated area, with the accumulation of land growing with the size of farms (Ruiz Maya, 1990). This concentration of land depended on the smaller farms that disappeared together with the farmers who worked them. Likewise, this process incentivized a more intense substitution of machinery for manual labour, a process that took place with greater emphasis in the 1960s on larger farms.

Labourers. As with irrigation, this variable appeared to be significant in the regressions for the 1960; however, it no longer had any significance in any model in the 1970s. Its negative sign indicates that the provinces with a substantial proportion of farm labourers in the total population employed in the agricultural sector were more likely to experience severe demographic losses. In this regard, land parcel amalgamation and an increase in acreage were associated with a reduced need for farm labourers as a result of the greater ease with which mechanization was introduced. Before this process, in around 1950, agricultural productivity was 60% lower than productivity in Spain's other economic sectors (Prados de la Escosura, 2003), with a chronic oversupply of labour, particularly in provinces with a high concentration of land ownership. Therefore, as mechanization advanced, it encouraged the exit of temporary labourers from the countryside (Langreo & Sumpsi, 1993). This process of employment loss for the temporary labourers who would travel from town to town, owing to the introduction of farm machinery, was explained by Pérez Díaz (1969: 176). Political intervention by the Franco regime was also an important factor. The conservative agrarian counter-reform frustrated labourers' expectations of achieving land ownership, specifically in the large estates of

the south, introducing spatial differences into the mobility of the rural population (Sánchez Alonso, 2010: 142).

Wheat. The participation of wheat in the agricultural output of each province was also significant in both decades, but only when the *Marketsize* control variable was introduced. Its negative sign indicates that a larger initial percentage of wheat, as a percentage of the total provincial agricultural output, meant there was greater difficulty in maintaining farms in the new context, together with lower needs for labour resulting from easy mechanization. According to the INE agrarian censuses, the most intense abandonment of farms took place in wheat-farming areas with acreages of less than 10 hectares (46.2% between 1962 and 1972). Agricultural policy was not free of responsibility for this trend, given that the emphasis placed on the need for an agricultural enterprise of a feasible size was also related to the process of changes in farming type. In fact, the government followed the recommendations of the 1966 World Bank and FAO report on Spanish agriculture, which advised: "gradually eliminate the current subsidy programme for small wheat farms, as this conflicts with the efforts presently being made by the National Land Consolidation Service, given that it gives preferential treatment to wheat producers and acts a disincentive to the creation of more feasible and larger units" (World Bank & FAO, 1966: 202). In fact, the freezing of official prices paid for wheat during the late 1960s and early 1970s was exceedingly detrimental for farms that had a lower acreage and were more fragmented in nature, encouraging their abandonment (Clar, 2005). In other words, the measures implemented seemed to have only reinforced a trend already present in Spanish agriculture: growing wheat was a business of the past and had virtually no future.

MigratRate_pd. The provincial migration rate for the preceding decade was seen to be a highly decisive variable both in the 1960s and 1970s, although it was much more influential in the former. Its positive sign indicated the reproduction of migratory trends over time, supporting the existence of areas that were net exporters of population and highly delimited areas that received population. The strength of the migratory process in the 1960s reflected dynamics that would continue and magnify the population displacement initiated prior to Spain's economic boom in the wake of the National Plan of Economic Stabilization of 1959. The great intensity with which this process took place in the ten years following the implementation of the plan would explain the lessening of its impact in the 1970s.

Marketsize showed a negative coefficient, which implied a rural penalty in line with the conclusions of Paluzie *et al.* (2009) in their study on market potential in Spain. However, an interpretation regarding agricultural modernization should be added at the same time. Given that this process had already begun in the 1950s with the implementation of the Servicio de Extensión Agraria, among other previously mentioned measures

(plots, farm size, tractors), the different pace of modernization led to differences in the economic potential of agriculture to retain population when the great rural exodus was triggered. Thus, the size of the agricultural market introduced not only a difference in quantity, but also in quality: while some provinces presented a modern style of agriculture in 1960, the traditional model still prevailed in many others, which was less able to withstand the mass abandonment of the countryside. In any case, the high degree of correlation between this variable and the net migration rate of the previous ten-year period for both of the studied decades shows a distinct penalization suffered by the agrarian population. Not only did this affect wheat, as previously described, but agriculture in general, which seemed to have become an activity with a bleak future.

How can the difference between the results obtained for both decades be explained? The different patterns found in the 1960s and 1970s are coherent with the general migratory pattern observed. First of all, during the second half of the 1960s and the first half of the 1970s, the rural exodus had already lost impulse; secondly, while long distance migrations were predominant in the 1960s, the majority of migrants in the 1970s came from within the same province, a new pattern that became the rule from that time onwards (Romero, 2003).

Behind these changes between decades there was also an agricultural explanation to be found. The 1960s marked the peak of the agricultural modernization process on a form of agriculture that still was quite labour intensive. In the 1970s, with the agricultural modernization process practically complete, the conditions initially experienced by agriculture lost significance as an explanation for rural migratory flows, which persisted as a continuation of the previously established patterns of mobility.

Based on the results obtained, the modernization process demographically penalized three problematic features that had characterized traditional agriculture in Spain: excessive reliance upon wheat crops (habitually with low yields per acreage), excess dependence on seasonal labourers working for low wages, and excessive fragmentation of farms. On the contrary, the availability of irrigated land, a feature of agricultural modernization which was not new in the Spanish countryside, had a positive impact on migration in the rural setting. The crisis in the traditional agrarian model coincided with the period of the greatest shift in population from the countryside to urban areas throughout the 1960s, with both phenomena reinforcing the other. And although the government's agrarian policy had sought to bring about a rapid modernization of Spanish agriculture since the 1950s, the transformation of agriculture (modern inputs, irrigation, biological innovations) had already started in certain provinces during an earlier period, even predating the Spanish Civil War (Clar & Pinilla, 2009).

In general terms, provinces with delayed agricultural transformation experienced worse demographic performance. On the contrary, those provinces whose agriculture had already been modernized by the beginning of the 1970s, at the latest, performed better in terms of depopulation, partly because, along with the process of modernization, their rural populations would have already undergone adjustment prior to 1960. The necessary adjustment came about not only in terms of active population but also in terms of output. Consequently, the agrarian penalty detected in our second control variable *(Marketsize)* is related to an unadjusted weighting for agriculture in the provincial economy, which was higher in those places where the traditional labour-intensive model lasted longer.

7. CONCLUSIONS

The results obtained show that the influence of the initial degree of agricultural transformation on the different magnitudes of rural migration in the Spanish provinces during the great exodus of the 20th century should not be underestimated, whether it took the form of a push effect for more traditional forms of agriculture or of a certain retaining effect for those forms of agriculture that had been modernized at an earlier time. The link detected between specific agricultural features leading to a greater/lesser modernization and the rural net migration rates seems to indicate this.

There are a number of different reasons for this. To start, an earlier transformation stage, which had already taken place in several provinces in the 1950s, may have brought forward the adjustment in agricultural and rural populations. Moreover, a structural change that was more drawn out over time (50 years or more for some provinces) moderated the strong impact of the far-reaching restructuring of the 1960-81 period. This also goes to emphasize the importance of path dependency in the Spanish agricultural shift during the 20th century from the provincial perspective. Additionally, the development of the agri-food industry and commercial distribution chains, sectors that were buoyant in the studied decades, were better connected with forms of agriculture that had greater capacity for adaptation, distanced at an earlier time from the traditional model that was still practised in a large part of Spain by 1960.

In any case, the results obtained introduce two important clarifications to the assertions made in the first paragraph. The first is that the initial conditions experienced by agriculture did not play the same role in both decades. Actually, the influence of the agrarian variables was essentially limited to the decade of 1960-70, when both the rural exodus and agricultural modernization were at their peak. The second is that the impact of the preceding migratory trend for both decades was a primary explanatory factor for net rural migration

rates. All of this reflects an intense underlying demographic dynamic with a strong inertia of its own, which should not be overlooked when it comes to evaluating the power of the agrarian factors obtained in our analysis explaining migratory trends.

Finally, the whole process of agricultural modernization was not overlooked by the policies for transforming the Spanish countryside put in place by the Franco regime. The encouragement of direct farming by landowners, the drive towards farms with fewer plots, larger acreage and greater capital investment, and the emphasis on irrigation and new, more profitable crops determined a highly restricted form of agriculture that hindered the continuity of more traditional farmers on the land. Although "fewer farmers and better agriculture" was the catchphrase given to this process, it is not clear whether these agricultural policies also pursued a sharp reduction in the rural population. Intentional or not, our results indicate that some of these measures would have contributed to the intensification of rural out-migration, at least in the 1960s.

The peak of the rural exodus in Spain took place in the same period when agriculture became a minor sector both in terms of output and employment. Since then, agriculture has been able to do little to avoid the continuous flight from the countryside. However, its viability –in combination with other sorts of related activities (agroindustry) and services (rural tourism, adventure and outdoor sports)– still appears to be a key factor for the creation of economic infrastructure capable of curbing depopulation in the countryside.

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