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Changes of Dynamics in Local Productive Systems Based on the Iberian Pig Transformation Industry in Western Sierra Morena (Spain)

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Citation: Pizarro-Gómez, A.; Šadeikaitė, G.; García-Delgado, F.J. Changes of Dynamics in Local Productive Systems Based on the Iberian Pig Transformation Industry in Western Sierra Morena (Spain). *Land* **2021**, *10*, 1343. <https://doi.org/10.3390/land10121343>

Academic Editors: Francisco Manuel Parejo-Moruno, Anonio Miguel Linares-Luján, José Francisco Rangel-Preciado and Esteban Cruz-Hidalgo

Received: 11 November 2021
Accepted: 2 December 2021
Published: 6 December 2021

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Abstract: Local Productive Systems (hereinafter LPSs) based on agro-food industries constitute alternative models of development in peripheral rural areas that are subject to internal and external dynamics and processes. The main objective of this research is to investigate these processes and their consequences on four LPSs based on the Iberian Pig Transformation Industry (hereinafter LPS-IPTI) in SW Spain: Fregenal de la Sierra, Higuera la Real, Cumbres Mayores and Jabugo. Using secondary data, a comparison is made between 2002 and 2020 to establish the changes, causes and consequences on the LPS-IPTIs studied. The results obtained indicate (1) the business and territorial concentration of LPS-IPTIs; (2) changes in the structure of the LPS-IPTI due to internal and external causes that were already present before the international economic crisis; (3) productive and territorial specialisation in standardised products and quality products that generated the polarisation of the sector; (4) simplification of industrial processes; (5) loss of employment, especially female; (6) external control of companies in the sector which, accordingly, brings about the loss of prominence of local actors in favour of foreign companies, reduced social capital and the progressive loss of ownership of the LPS.

Keywords: local productive systems; meat industries for the transformation of the Iberian pig; business processes; territorial processes; labour processes

1. Introduction

Rural and marginal spaces have experienced a structural economic, demographic and territorial crisis since the middle of the 20th century [1,2]. They turned into marginal areas to the dominant development processes resulting in depopulation, lack of proper transportation connection and inability to adjust to the markets [3,4]. These zones can also be considered disadvantaged in terms of the absence of public and private services and low levels of investments [5,6] as well as marginalised due to the lack of demand thresholds, low profitability or “few voters” [6] where development seems to flee from [7].

In this unfavourable context, *The Future of Rural Society* [8] represented a turning point in Europe by proposing the “rural development from within”, in which social and environmental endogenous resources replace exogenous resources in the processes of rural development [9]. Thus, rural development became the second pillar of the Common Agricultural Policy (hereinafter CAP) after the productive one, and community rural development policies set guidelines to generate multi-functionality and diversification, improve agricultural production, fix population, generate employment and income [10]. However, although the implementation of rural development policies produced obvious transformations [11], the effects of rural development have been uneven which, accordingly, further increased the differences between affluent and marginal rural areas [12] by contributing more to the development of the most central areas [4]. Peripheral rural areas continue

to suffer the loss of traditional activities and employment [1] that is aggravated by their marked periphery [3]. The competitiveness of these peripheral areas is therefore linked to their adaptive strategies which allow them to overcome the obstacles imposed by their periphery, such as difficulties of access, competition and support from the local community, rejuvenation and fixation of the population, and resulting in negative effects, including but not limited to social and economic decline, depopulation, land fragmentation, limitation of holdings, insufficient income to maintain activities and abandonment of the territory, among others [2,6]. Given such circumstances, endogenous industrialisation models are observed as alternative models [13].

In 1890, Alfred Marshall identified the tendency of the spatial concentration of small and medium-sized companies (hereinafter SMEs) similar to each other. These companies generated specialised industrial areas and were alien to those of large capitalist factories, which were called “Industrial Districts” [14], later known as “Marshallian industrial districts” [15,16]. This concept was recovered by Italian economists in the 1970s [17]. Later, the concept of the Local Productive System is introduced [18,19] to define the levels of organisation of SMEs located in a territory that does not coincide with the vertical industrial structure, but rather corresponds to a specialised horizontal organisation [15]. Becattini [19] (p. 38) defined an LPS as “a socio-territorial entity that is characterised by the active presence of both a community of people and a group of companies in a natural and historically determined area” that relates to historical, cultural and socio-economic reality [20]. Thus, the formation of an LPS in a territory has a positive impact on the competitiveness of the companies that are part of it [21] (p. 7). These processes consequently contribute to the improvement of the economic and social conditions of the areas where the determining factors are controlled by local agents [21].

The birth of an LPS is formed by the presence of primary elements such as raw materials [14,22,23] which generally emerge due to secondary factors, such as know-how, infrastructure and external stimulus [24], to achieve great economic dynamism through the generation of value chains. The study of LPSs as rural industrialisation models based on their endogenous potential, quasi by analogy, passes to other disciplines, gaining special interest for territorial studies [25] despite a changing of themes. Thus, from a local development perspective [26], this study encompasses the elements of territorial innovation [25,27,28], leadership and territorial management [29], political actions and governance [30,31], territorial marketing [32] as well as analysis of the LPS’s strength in crises [33–35].

In the case of agro-food industries, the proper agro-industrial districts are [36–38] defined by territorial and social embeddedness [39] and generation of employment, benefiting from the know-how given traditions and economic dynamism in terms of development of value chains [40]. However, the agro-food industry [41] has considerably transformed since the 1990s due to both internal territories- and companies-related causes, as well as external ones associated with the production, organisational matters, distribution and marketing and product quality of the markets [42]. The internal causes especially related to rural areas such as demographic decline, unemployment, low dynamism and innovation, fragmentation and business conservatism and dependence on natural factors also contributed to these changes [42]. External causes, linked to processes derived from globalisation and regionalisation of national economies [43], generated a true transformation of the food sector in terms of agriculture, industry, distribution and marketing of the production process, the organisation of companies, the institutional framework, distribution and the markets [44–49] particularly affecting Southern Europe [41,49,50]. These factors combined resulted in restructuring of the markets which favoured the increase of external hierarchy where the competitiveness of large companies worsened the results of small ones which were losing the importance of local skills [51]. Only authentic products maintained their importance as local products combining the attributes of “product-process-place”, known as 3P [52] (p.116), by valuing their origin and traditional production methods [39]. How-

ever, given the segmentation, these strategies also captured the interest of large capitalist companies and large retail distribution [53].

In the SW of the Iberian peninsula, there is a unique agro-silvopastoral system that encompasses the “dehesa”, a historically cleared Mediterranean forest in which extensive livestock farming of the Iberian pig, known as “porco preto” or “alentejano” in Portugal, has traditionally arisen and taken advantage of the acorns of holm oaks and cork oaks during the “montanera”¹, as shown in Figures 1 and 2 [54].

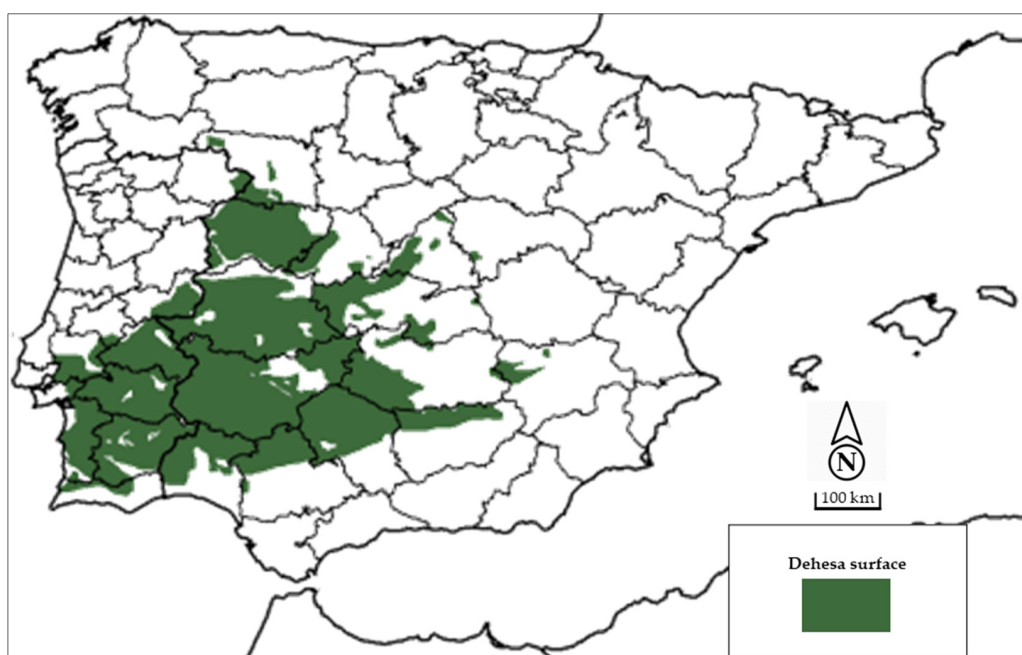


Figure 1. Distribution of dehesa in the Iberian Peninsula. Source: [55,56]. Authors own elaboration.

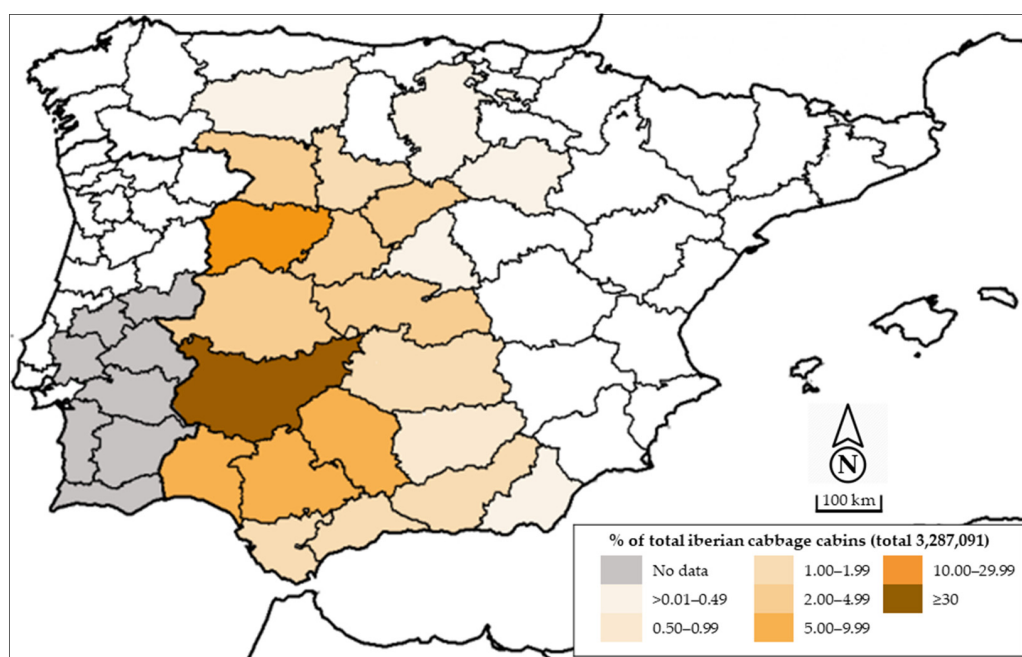


Figure 2. Distribution of Iberian Pig in the Iberian Peninsula (2018). Source: [57]. Authors own elaboration.

The Iberian pig transformation industries (hereinafter IPTIs) are located around the traditional production areas that produce international gourmet food, namely acorn-fed

Iberian ham [58]². IPTIs are industries with specific production systems [45] and an important territorial base [59] whose origin and location are defined by the primary and secondary factors, as indicated in Figure 3 [60].

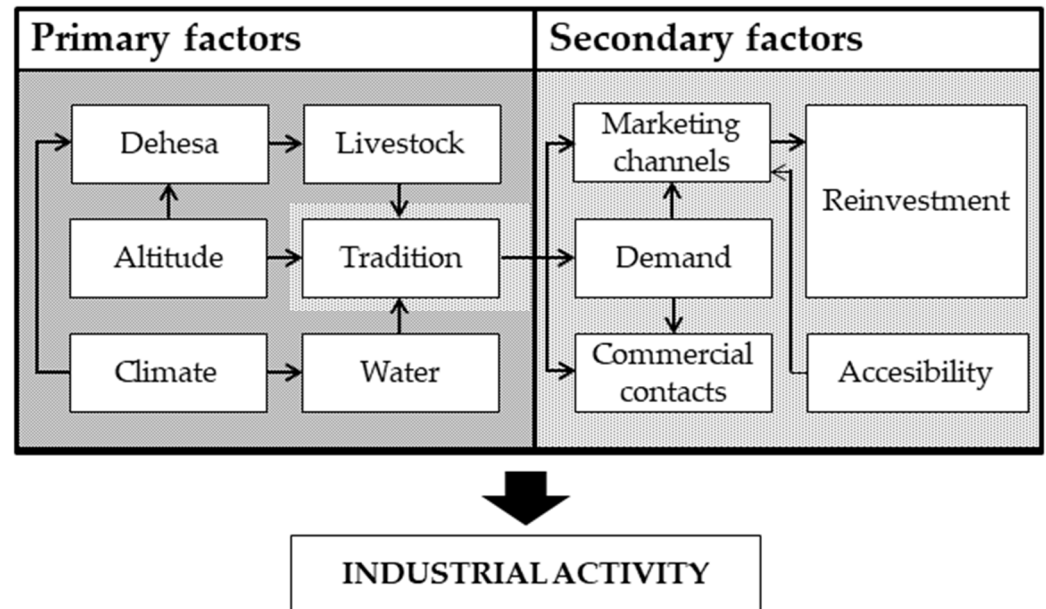


Figure 3. Primary and secondary factors of the IPTI. Source: [61] (p. 126).

The “territorial advantage” is among the primary factors [15] (p.19) related to the proximity of the raw material, namely, livestock, and the natural conditions such as climate and altitude necessary for curing products, and water which is necessary for the industrial process that, when combined, are fundamental for the location of the IPTI [62]. As in other agro-industries, these factors converge in the territory of tradition, know-how, ancestral values, non-transferable tacit knowledge, behaviours and institutions and social capital [15,20,25]. These factors also acquire identity values common to the population [63], which result in “the world of the Iberian pig” [54], where the know-how contributes to territorial development [63] through internal economies based on social capital.

The fact that the IPTI location does not fully coincide with those of production, as indicated in Figures 2 and 4, is due to secondary factors [60,64,65]. These secondary factors explain how to transition from a primary, livestock-driven system to the industrial one of the IPTI. Particularly, the use of marketing channels, increased demand, reinvestment of agricultural and non-agricultural capital, increased accessibility by railways and development of commercial contacts between production areas that make up industrial districts since the end of the 19th century [60,61] were fundamental factors that contributed to the improved performance of the IPTI [66].

Often, IPTIs tend to generate agglomerations [67]. Nonetheless, there are industries in various municipalities³ which could also be described by polycentric LPS [68] as industrial concentrations in the respective regions.

Through the scientific literature, nine municipalities in 3 provinces and 6 agrarian regions are identified as LPSs or LPS-IPTIs, as detailed in Figure 4:

- Province of Salamanca: Guijuelo (RAg. Alba de Tormes) and Ledrada (RAg. La Sierra) [69–76]⁴;
- Province of Badajoz: Fregenal de la Sierra e Higuera la Real (RAg. Jerez de los Caballeros, hereinafter RAgJC) [70,71,77,78]⁵, Jerez de los Caballeros (RAgJC) [78], Monesterio [78] and Azuaga (RAg. Azuaga) [78];
- Province of Huelva: Cumbres Mayores (RAg. Sierra, hereinafter RAgSH) [72,77,79] and Jabugo⁶ (RAgSH) [70–72,76,79].

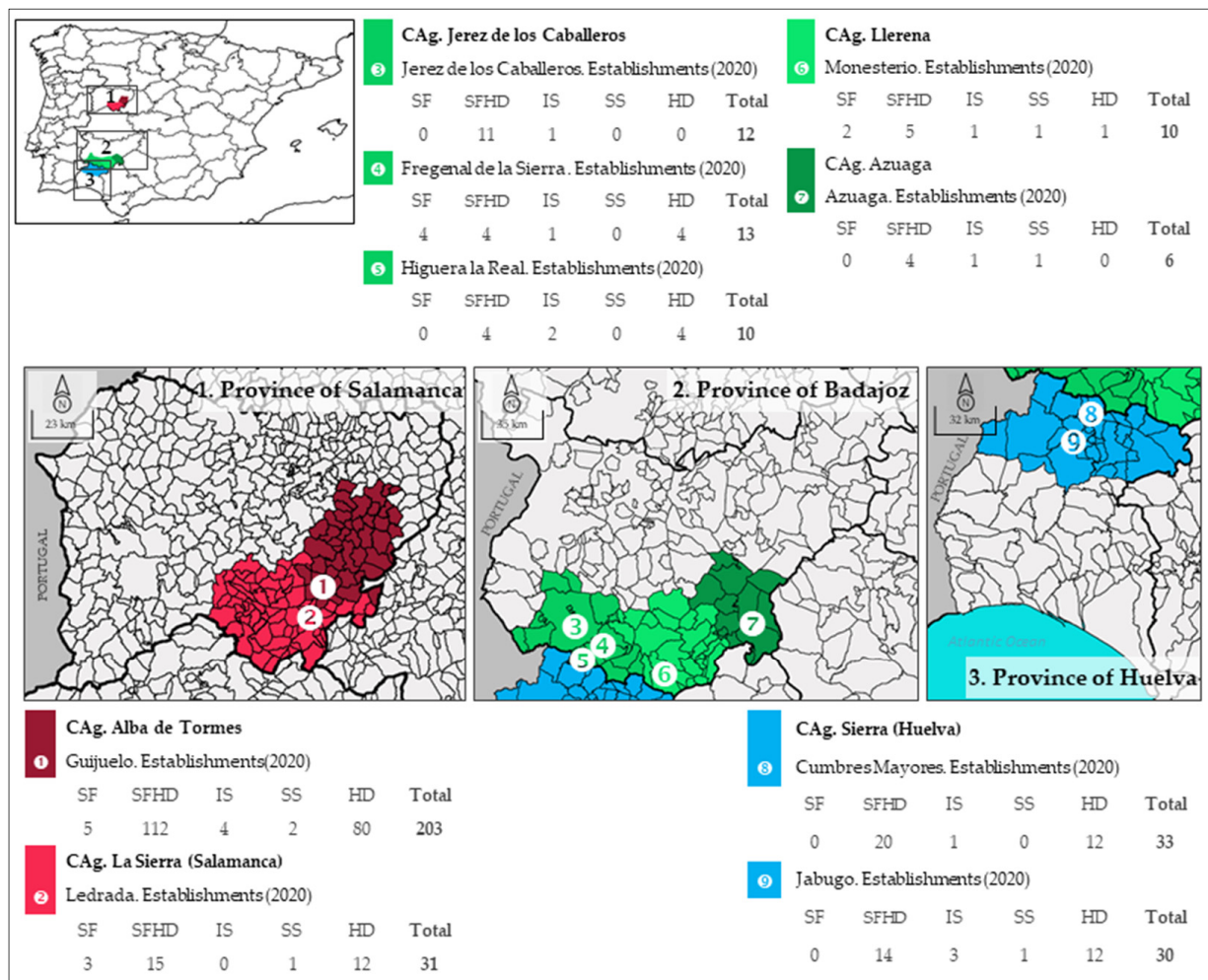


Figure 4. The localisation of LPS-IPTIs. Source: [80]. Authors own elaboration.

Altogether, among the none LPS-IPTIs, there are 348 industrial establishments [80] and a total of 286 companies [81], the largest number of which are based in Guijuelo (58.33% of the establishments and 55.59% of the companies), while the least of which are based in Cumbres Mayores (9.48% and 9.79%, respectively), as shown in Figure 4. Among the nine LPS-IPTIs, 41.24% of the Iberian hams were marketed in 2019 in Spain [82].

In some cases, IPTI agglomerations are identified in poly-specialised LPSs [78]. There is also a recent trend towards agglomeration in regional or functional headquarters, i.e., areas well communicated or close to the LPS-IPTI [42]. IPTIs present specific conditions, as indicated in Table 1, which characterise the formation and continuity of LPS-IPTIs.

Table 1. Specific characteristics of IPTI that determine LPS-IPTI.

Type	Factor	Characteristics
Natural	Climate (rain/drought; hot/cold)	Inter-annual fluctuations in the quality of the raw material (abundance or not of acorn). Alternation of scarce or abundant productions and variable quality of the products
	Climate/relief	Loss of part of production (shrinkage)
Agrarian	Non-subsidised livestock (outside the CAP)	Non-delocatable transformation
	Specific indigenous cattle	IPTI demand determines livestock production
	Extensive cattle	Racial purity: 100% Iberian, 75% Iberian, 50% Iberian Product shortage (and high price) Determine the quality (acorn, field, feed)

Table 1. Cont.

Type	Factor	Characteristics
Industrial	Vertical segregation of the transformation process	The specialisation of the establishments: sausage factory (hereinafter SF) only produces sausages; ham dryer (hereinafter HD) dries so-called noble pieces; sausage factory and ham drying room (hereinafter SFHD) produces sausages and dries noble pieces; industrial slaughterhouse (hereinafter IS) slaughters and integrates all the previous activities; slaughterhouse services (hereinafter SS) only slaughter for other companies
	Low application of advanced technologies and machinery	Limited to cold application, electrification and mechanical machines. Innovation focused on the presentation of products (sliced, boned, etc.) Dependence on climatic factors
	Dedication of industries to the same phase of the process	Little internal specialisation in the sector
	Rigid industrial process	Traditional product with a long life cycle (family brand, product quality, etc.)
Enterprise	Decapitalisation and long payback periods	Poor adaptation to changes and market demands Impossibility of investing. Indebtedness
	Traditional external relations	Demand for raw materials from livestock companies
Employment	The internal organisation of the company	Establishment of networks for the acquisition of services The predominance of the traditional company, based on personal relationships of those responsible for the company
	High qualification	The growing presence of external business groups Specialisation within the industry (master ham maker, butcher, pork meat specialist)
	Existence of Local Employment Systems (hereinafter LES)	Movement of workers between nearby municipalities (proximity trips)
	Know-how presence	Slaughter tradition moving to industrial employment
	Segregation by gender	Female employment in the production of cold cuts and fresh meat; male in the field, the slaughter and the production of hams and shoulders
Commercialisation	Seasonality of employment	The temporality of the raw material Noble pieces (hams, shoulders and loins), sausages, salted and fresh
	Diversity of Iberian pig products	Different qualities: with territorial ties (acorn, field) and without them (bait = intensive) Problems were due to ignorance (qualities, names, etc.). Market confusion, fraud
	International gourmet product	Noble pieces are known internationally and considered as luxury goods due to high price, very sensitive to fluctuations in demand
	Market segmentation	Based on quality (acorn, shoulders and loins) and counter-brand (hereinafter CB)
Institutional	Market fluctuations	Dependent on external and internal factors (cyclical crisis)
	The predominance of competitive relationships	The higher overall cost of the system (e.g., reaching the slaughter of animals at a great distance, for example)
	Generation of innovation networks (top-down approach)	Creation of Protected Denominations of Origin for Iberian Ham/Shoulder

Source: [42,59–61,83–89]. Authors own elaboration.

The changes that occurred in the agro-food industry in recent decades that affect the LPS-IPTI and the IPTI and shape them experience cycles of crisis and expansion [42,60,61,78,90,91]. From each of these crises, the sector emerges restructured, sometimes without having overcome the previous crisis [92]. These processes coincide with the idea of the life cycle of the LPS, developed by Belussi and Sedita [93] and is identified in the LPS-IPTI [90,91].

At the end of the 20th century and the beginning of the 21st century, the expansionary cycle motivated the increase in demand for a so-called luxury product that is projected in the sector with a production growth that generates a true so-called Iberian bubble [75]

in which everything “is for sale”. However, the international economic crisis meant the beginning of a deep crisis with important repercussions on the LPS-IPTI [42].

As internal and external dynamics and processes affect IPTIs and LPS-IPTIs, therefore, the central objective of this research is to study those dynamics and processes on LPSs that triggered evolution, adaptive changes and transformations in the last 20 years, based on the following three research questions: (1) What are the changes generated in IPTIs? (2) What are the repercussions on the LPS-IPTI? (3) What are the consequences on the labour market?

2. Materials and Methods

2.1. Materials and Data

The sources of data used in the research are secondary ones and include both official and private, fee-based databases, owned by private entities. The information on the industrial establishments for the transformation of the Iberian pig is obtained from the national state sources, in particular:

- Data in 2002 were obtained from the Registry of Establishments authorised for Intra-Community Exchanges (esp. “Registro de Establecimientos autorizados para Intercambios Intracomunitarios”; REAII, Ministry of Health and Consumption) [94]. Data were retrieved on 18 July 2002. There were 71 establishments among the four LPS-ICTIs studied;
- Data in 2020 were obtained from the General Health Registry of Food and Food Companies (esp. “Registro General Sanitario de Empresas Alimentarias y Alimentos”; RGSEEA, Spanish Agency for Consumption, Food Safety and Nutrition, Ministry of Health, which replaced the previous one since 2011) [80]. Data were retrieved on 16 March 2020. There were 86 establishments among the four LPS-ICTIs studied.

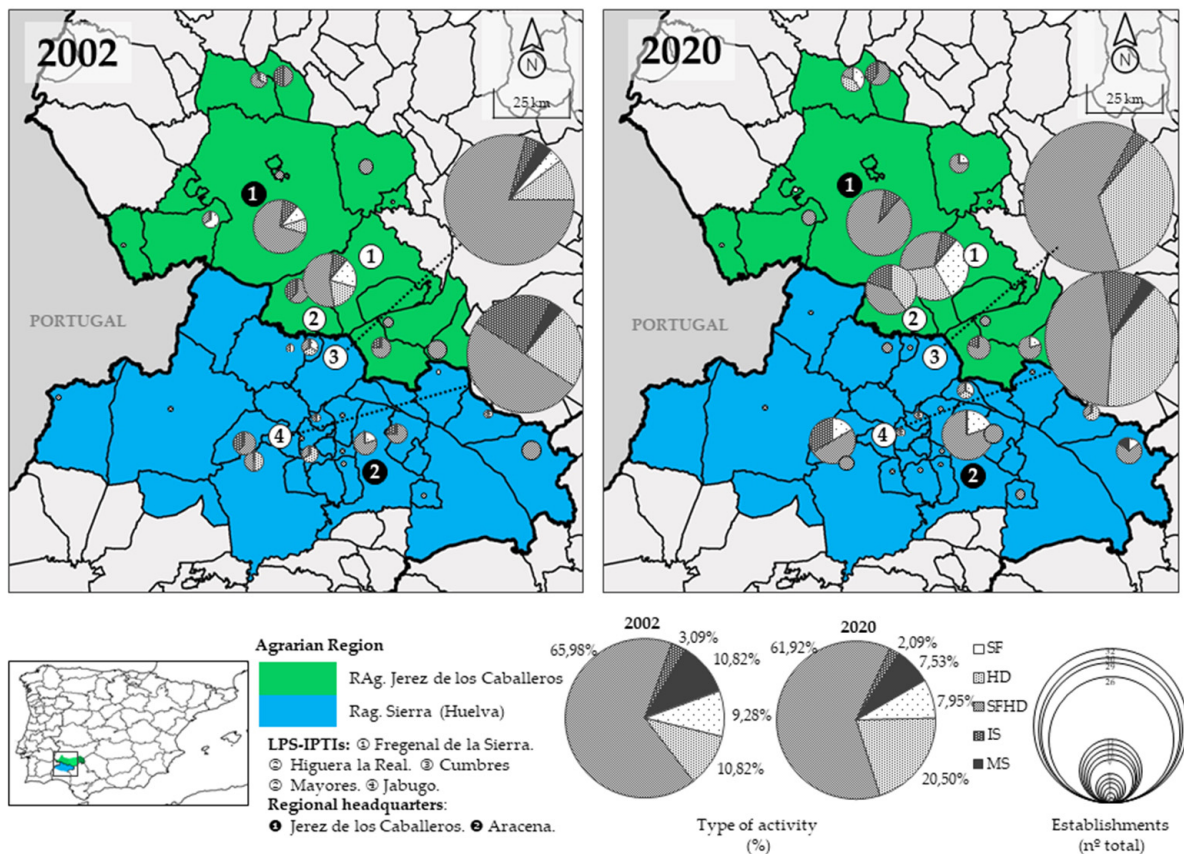


Figure 5. Scope of the study. Agrarian Regions and industries by municipalities (2002 and 2020). Source: [80,94]. Authors own elaboration.

These records exclusively offer static information at the time of consultation. Historical enterprise-related, economic-patrimonial and employment data throughout the period are used from the private SABI database, managed by Bureau Van Dijk [81], retrieved on 14 March 2020. Yet, this database does not offer information on social enterprises. For the period, the data from in total 94 companies are handled by counting registrations and terminations of activity. This information is complementary to that from Alimarket [95] and *Expansión* [96,97].

The information on products marketed by the municipality (2019) is obtained from the “Informative Registry of Independent Control Organisations of the Iberian Peninsula” [82] (esp. “Registro Informativo de Organismos Independientes de Control del Ibérico” (hereinafter RIBER), Ministry of Agriculture, Fisheries and Food).

The Andalusian Multi-territorial Information System [98] database of the Andalusian Statistical Institute (hereinafter IECA) was used for territorial data on employment and specialisation in Andalusia, and the employment data were obtained from ARGOS Observatory [99]. The existence of two different Autonomous Communities made it necessary to process the data to homogenise it. Employment data on the Affiliations to Social Security were retrieved from the Ministry of Employment and Social Economy [100,101]. Unemployment rates in terms of municipal averages were obtained from the *Expansión* database in a continuous series from 2006 to 2020 [102].

To complement these secondary sources with quantitative and qualitative information, two questionnaires were used for the IPTIs of Sierra Morena Occidental in 2002 (hereinafter Q1) [60] and Jabugo in 2016 (hereinafter Q2) [61]. Informal interviews with professionals from the Iberian pig sector were further added to these data sets.

2.2. Methods

This research undertook a multidisciplinary approach and is framed within the Geography of the Company [103–107] analysing business structure, territorial and labour changes that can occur in the LPS-IPTI in a specific field. Thus, to deepen the understanding of the context, the methodology of the case study approach was used. Specifically, the municipalities of Fregenal de la Sierra, Higuera la Real, Cumbres Mayores and Jabugo in SW Spain were the cases analysed in this research.

This methodology implies the extensive collection of quantitative information for two different periods: the year 2002, in which the IPTIs were in full expansion; and the year 2020, in which they were in post-international economic crisis recovery. Based on the information collected, an analysis is carried out using qualitative techniques to establish the causal relationships that explain the transformations that have taken place in the sector. The authors follow in this work the same methodology already applied both at the local level [61,89,108] and the municipality level [42,60,89].

2.3. Scope of the Study

Out of the set of nine LPS-IPTIs identified, four located in Sierra Morena Occidental were studied, namely Fregenal de la Sierra and Higuera la Real in the RA_gJC (Province of Badajoz, Autonomous Community of Extremadura) and Cumbres Mayores and Jabugo (RA_gSH, Province of Huelva, Autonomous Community of Andalusia) (see Figure 5).

The selection criteria for these four LPS-IPTIs were (see Table 2; Figure 5): specialisation; embeddedness of IPTI in the local environment; known increase between 2002 and 2020; similar natural and socio-demographic characteristics of the regions in which they are located; population (<5000 inhabitants); proximity and territorial continuity (except for Jabugo); not regional headquarters; the emergence of from the inauguration of the Zafra-Huelva railway (1889) [60]; and the availability of the data from 2002 (Q1) [60] to ensure the comparisons.

Table 2. LPS-IPTI selection variables.

Variable	Fregenal de la Sierra	Higuera la Real	Cumbres Mayores	Jabugo
IPTIs in LPS-ICTIs (2002/2020) [80,94]	11/13	5/10	29/33	26/30
% IPTIs in the Region (2002/2020) [80,94]	20.37/20.00	9.26/15.38	29.90/27.27	26.80/24.79
Population (2019) [109]	4836	2253	1749	2250
Shorter distance from LPS-ICTI (km)	5.7	5.7	16.6	28.8
Longer distance from LPS-ICTI (km)	41.1	35.1	28.8	41.1
Distance from regional headquarters (km)	25.0	27.7	38.6	22.3

3. Results

Compared among the four LPS-IPTIs, Cumbres Mayores and Jabugo were mostly noted for their important industrial activity for both years analysed in this study, as shown in Table 3. Although this concentration did not alter, between 2002 and 2020 the number of industrial establishments and companies increased in the four LSP-IPTIs. The growth of Higuera la Real stood out with 80.00% growth of the number of companies and 100.00% growth of the number of the establishments, while the rest grew moderately (see Table 3). The number of establishments, including secondary establishments, i.e., not in headquarters, increased greater in comparison with the number of the companies.

By type of activity (see Table 3), the highest growth occurred in all LSP-IPTIs in the HDs by 181.82%, with those in Cumbres Mayores standing out, as well as in Jabugo and Higuera la Real in absolute numbers. The number of SFs grew moderately by 33.33%, but only in Fregenal de la Sierra. The rest of the activities were reduced as a whole, especially the ISs by -30.00% and SSs by -50.00% , but the changes were only registered in Cumbres Mayores and Jabugo. SFHDs increased in Higuera la Real and Jabugo, and decreased in Cumbres Mayores and Fregenal de la Sierra, losing a moderate -6.67% overall. All types of activities existed only in Cumbres Mayores in 2002 while the SS activity changed in 2020, initially, the least diversified being Higuera la Real, consisting of SFHDs and ISs, and HDs incorporated only in 2020.

The variations in the industrial and business structure comparing 2002 and 2020 affected 40.85% of the establishments and 46.04% of the companies, as indicated in Table 4. Termination of activities of establishments accounted for 28.17%, particularly in the activities of SFs and SSs. The registration of new establishments stood out among the HDs and SFs, while there were no registrations observed in the IS and SS activities. Changes of ownership, including companies acquired after the termination of the activity, in particular, affected ISs and SSs more compared with SFHDs and HDs, and were not observed in SF activities.

In terms of LPS-IPTIs, the variations affected 61.54% of the companies in Jabugo and 50.00% in Fregenal de la Sierra, and only 20.00% of companies in Higuera la Real, while in Cumbres Mayores this variation was intermediate and impacted 36.50% of the companies (see Table 4). The layoffs particularly affected Jabugo in 45.83% of the establishments, with 50.00% of layoffs being in the HDs and 46.15% in SFHDs compared with only 24.14% of dismissals in Cumbres Mayores at SFHDs and SFs. The registration of new activities was especially observed in Higuera la Real, where the number of SFHDs doubled, compared with approximately 30.00% increase of new establishment, mainly concentrated in HDs. The changes in ownership mostly occurred in Jabugo (37.50%) and Fregenal de la Sierra (36.36%), and were considerably above the levels of changes reported in Higuera la Real (20.00%) and Cumbres Mayores (13.79%).

Although terminations of activity were concentrated between 2014 and 2017, as shown in Figure 6, particularly in Jabugo, they were frequent throughout the entire period of the research. In the case of new registrations, they were concentrated between 2002 and 2005 and, especially, between 2005 and 2020. Changes in ownership begin to be frequent as of 2012 due to the construction and reopening of closed companies.

Table 3. Variation in the industrial and business structure in the 4 LPS-IPTIs (2002–2020).

Variable	Fregenal de la Sierra			Higuera la Real			Cumbres Mayores			Jabugo			Total (4 LPS-ICTI)		
	2002	2020	Δ%	2002	2020	Δ%	2002	2020	Δ%	2002	2020	Δ%	2002	2020	Δ%
No. of companies	10	12	20.0	5	9	80.00	24	28	16.67	24	26	8.33	63	75	19.05
SF	2	4	100.00	0	0	-	1	0	-100.00	0	0	-	3	4	33.33
SFHD	6	4	-33.33	3	4	33.33	23	21	-8.70	13	14	7.69	45	42	-6.67
HD	2	4	100.00	0	4	-	3	11	266.67	6	12	100.00	11	31	181.82
SI	1	1	0.00	2	2	0.00	1	1	0.00	6	3	-50.00	10	7	-30.00
SS	0	0	-	0	0	-	1	0	-100.00	1	1	0.00	2	1	-50.00
No. of establishments	11	13	18.18	5	10	100.00	29	33	13.79	26	30	15.38	71	86	21.13

Source: [80,94]. Authors own elaboration.

Table 4. Variation in the industrial and business structure in the 4 LPS-IPTIs (2002 and 2020).

Variable	Fregenal de la Sierra				Higuera la Real				Cumbres Mayores				Jabugo				Total (4 LPS-IPTI)			
	Termination of Activity	Registration	Change of Ownership	No Change of Company	Termination of Activity	Registration	Change of Ownership	No Change of Company	Termination of Activity	Registration	Change of Ownership	No Change of Company	Termination of Activity	Registration	Change of Ownership	No Change of Company	Termination of Activity	Registration	Change of Ownership	No Change of Company
No. of SF	0	2	0	2	-	-	-	-	1	0	0	0	-	-	-	-	1	2	0	2
No. of SFHD	1	0	3	2	1	1	1	0	6	4	3	16	6	3	5	6	14	8	12	24
No. of HD	0	1	0	2	0	4	0	0	0	5	0	0	3	5	2	3	3	15	2	5
No. of IS	0	0	1	0	-	-	-	-	0	0	0	1	1	0	2	3	1	0	3	4
No. of SS	-	-	-	-	-	-	-	-	0	0	1	0	1	0	0	0	1	0	1	0
No. of establishments	1	3	4	6	1	5	1	4	7	9	4	20	11	8	9	12	20	25	18	42
No. of companies	1	3	4	5	1	4	1	4	7	9	4	15	11	6	9	10	20	22	18	34
SF, %	0.00	100.00	0.00	100.00	-	-	-	-	100.00	0.00	0.00	0.00	-	-	-	-	33.33	66.67	0.00	66.67
SFHD, %	16.67	0.00	50.00	33.33	33.33	33.33	33.33	0.00	26.09	17.39	13.04	69.57	46.15	23.08	38.46	46.15	31.11	17.78	26.67	57.14
HD, %	0.00	50.00	0.00	100.00	-	-	-	-	0.00	166.67	0.00	0.00	50.00	83.33	33.33	50.00	27.27	136.36	18.18	45.45
IS, %	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	16.67	0.00	33.33	50.00	10.00	0.00	30.00	57.14
SS, %	-	-	-	-	-	-	-	-	0.00	0.00	100.00	0.00	100.00	0.00	0.00	0.00	50.00	0.00	50.00	0.00
Establishments, %	9.09	27.27	36.36	-	20.00	100.00	20.00	-	24.14	31.03	13.79	-	45.83	33.33	37.50	-	28.17	35.21	25.35	59.15
Companies, %	10.00	30.00	40.00	50.00	20.00	80.00	20.00	80.00	29.17	37.50	16.67	62.50	42.31	23.08	34.62	38.46	31.75	34.92	28.57	53.96

Source: [80,81,94]. Authors own elaboration.

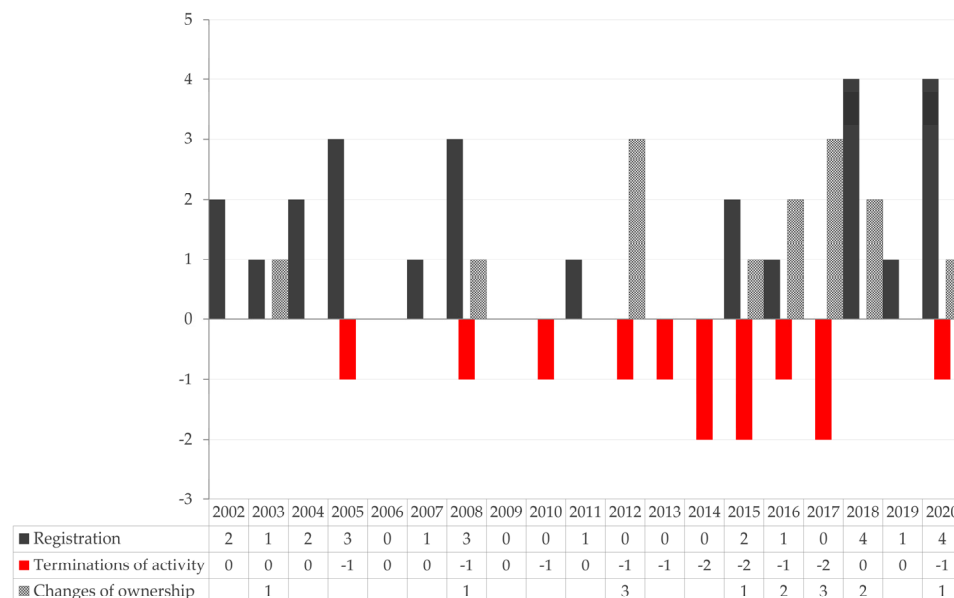


Figure 6. Registrations, terminations of activity, and changes of ownership per year (2002–2020). Source: [80,81,94]. Authors own elaboration.

Overall, 11 establishments, or 21.57% of the establishments that continued, changed their activity between 2002 and 2020, as detailed in Table 5. The change from SFHDs to HDs stood out and consisted of 45.45% of all the changes. The latter affected six establishments, or 27.27% of the establishments that continued, in Cumbres Mayores, and five establishments, or 21.74% of the establishments that continued, in Jabugo; in both cases, there were three changes in activity after a change of ownership. However, in the LPS-IPTIs of Fregenal de la Sierra and Higuera La Real, there were no changes of activity, even when a change of ownership took place.

Table 5. Activity changes in 2002 and 2020 in IPTI in the 4 LPS-IPTI.

Activity in 2002	Activity in 2020																									
	Fregenal de la Sierra					Higuera la Real					Cumbres Mayores					Jabugo					Total (4 SPLITI)					
	SF	HD	SFHD	IS	SS	SF	HD	SFHD	IS	SS	SF	HD	SFHD	IS	SS	SF	HD	SFHD	IS	SS	SF	HD	SFHD	IS	SS	
SF																										
HD	0	0	0	0	-	-	-	-	-	-	1	0	0	0	-	-	-	-	-	-	1	0	0	0	0	0
SFHD	0	0	0	0	-	-	-	-	-	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
IS	0	0	0	0	-	0	0	0	0	-	0	3	0	0	0	2	0	0	0	0	0	5	0	0	0	0
SS	-	-	-	-	-	-	-	-	-	0	0	0	1	0	0	1	1	0	0	0	0	1	2	0	0	0

Source: [80,81,94]. Authors own elaboration.

In 2002, a total of six companies had two establishments, or 11.27% of the total, where five of them (17.24%) were in Cumbres Mayores and one (9.09%) in Fregenal de la Sierra. In 2020, 11 establishments (12.79% of the total) were present in all LPS-IPTIs, with a single change in the previous ones where one SFHD turned into HD in Cumbres Mayores. Also, there was an increase of HDs in Jabugo and Higuera la Real by 13.33% and 10.00% of all establishments, respectively.

The predominant type of companies in 2002, as shown in Figure 7, were family-owned businesses, followed by business groups, with shareholders that participated in more than one company, and social enterprises with predominant self-employment which was observed at 81.82% of the total in social enterprises. In all cases, SFHD is the most prominent activity in all types of companies, including in 72.72% of social enterprises, 66.66% of family-owned companies and 54.54% of business groups. Family-owned businesses predominated in Jabugo and Cumbres Mayores, while their number was below the average in Fregenal de la Sierra and Higuera la Real. In Higuera la Real business groups were predominant, being important in Jabugo and Fregenal de la Sierra. Social enterprises appeared only in Cumbres Mayores and Fregenal de la Sierra.

Family-owned businesses decreased as a whole in 2020, where 38.71% were newly created and 6.45% were social enterprises. Business groups become the most important group, particularly given the changes in the ownership of family-owned businesses (50.00%) and the creation of new companies (16.13%). The social enterprises were maintained at the same level in terms of percentage. In terms of activity, SFHD dominated among social enterprises (61.54%), business groups (53.12%) and family-owned businesses (48.39%); however, the number of HDs grew between the latter two types of companies by 21.87% and 38.71%, respectively. Family-owned businesses dominated in Cumbres Mayores and Fregenal de la Sierra, where their weight increased, even though it declined in Higuera la Real and, especially, in Jabugo. Business groups dominated in Jabugo and Higuera la Real, while they were equal with the number of family-owned business in Fregenal de la Sierra, and remained at low levels in Cumbres Mayores. Social enterprises only stood out in Cumbres Mayores, whereas they were particularly scarce in Higuera la Real and Fregenal de la Sierra, and non-existent in Jabugo.

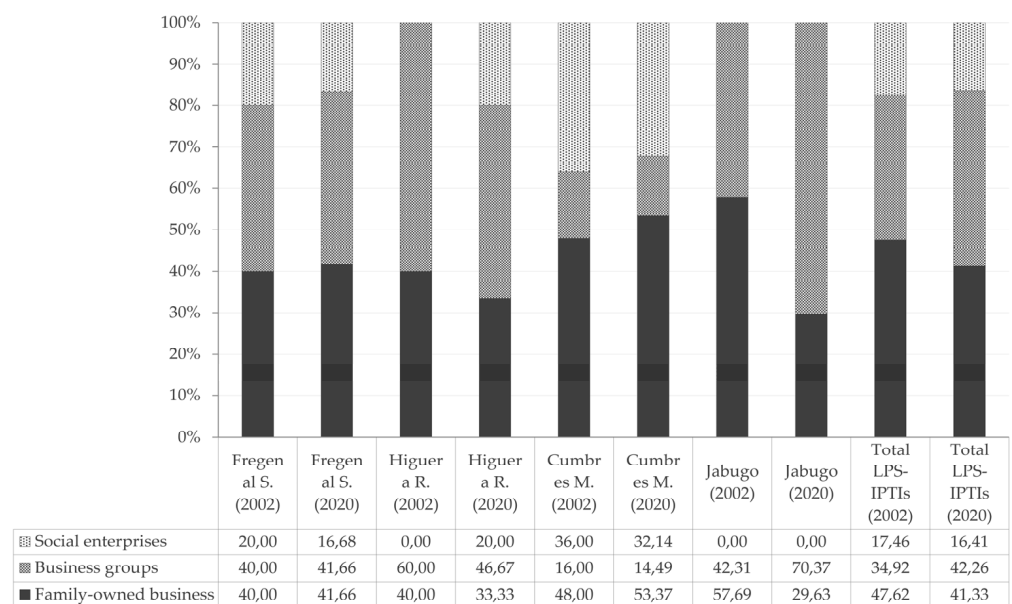


Figure 7. Type of companies (2002 and 2020). Source: [80,81,94]. Authors own elaboration.

In 2002, 63.49% of the companies had their headquarters in the municipality of the establishment, as seen in Figure 8. All the companies in Higuera la Real were based in the municipality and in some cases had regional ties. Companies also played an important role in Fregenal de la Sierra (70.00%) and Cumbres Mayores (68.00%), while their number decreased in Jabugo to 42.31%. In 2020, the number of companies based in the LPS-IPTIs dropped to 56.00%. The number of companies with the local headquarters increased in Fregenal de la Sierra (91.66%) and Cumbres Mayores (75.00%), while it decreased in Higuera la Real to 60.00% and, above all, in Jabugo to 19.23%. By type of activity, the SFHD stood out in 2002 with 47.83%, remaining at 48.48% in 2020, while the number of HDs increased to 33.33% in 2020 compared to 28.57% in 2002.

The size of the company could be established from the total production (volume), its economic information (total assets ⁷), as indicated in Table 6, and employment, as depicted in Table 7.

According to the total assets (see Table 6), out of the 58 companies with data available for 2019 (77.33% of the total) were dominated by micro-sized companies (39.66% of those analysed), with the main group being ($\leq 50.00\%$) in Cumbres Mayores and Fregenal de la Sierra; while the small-sized companies accounted for 32.76% of those studied, being the most important group in Jabugo (33.33%) and Higuera la Real (42.86%). The medium-sized companies (18.97%) appeared in all the LPS-IPTIs, but they were only important in Jabugo

(29.17%), while the large-sized companies (8.62%) only appeared in Jabugo (16.67%) and Fregenal de la Sierra (10.00%).

According to production (see Table 6), in the 2000–2001 season out of the 34 companies with data available (53.96% of the total in 2002) were the large-sized companies (32.35%), which prevailed over the medium-sized and small-sized companies (both with 26.47%) and macro-sized companies (8.82%), while micro-sized companies were the least frequent (5.88%). The average size of companies was greater in Fregenal de la Sierra and Jabugo, compared to other municipalities. These two were the only municipalities where macro-sized enterprises existed, while the tendency that micro-sized enterprises (non-existent in Jabugo) and small-sized enterprises terminated their activity was observed (45.45% of liquidations). Additionally, Q2 provided data from 13 companies in Jabugo for the 2014–2015 season that indicated that micro-sized companies did not appear and did not exist in 2002 either, and small-sized companies disappeared (two terminations of activities in 2002), while the number of medium-sized companies reduced from four to three, the number of large-sized companies increased from three to eight and the number of macro-sized companies remained the same.

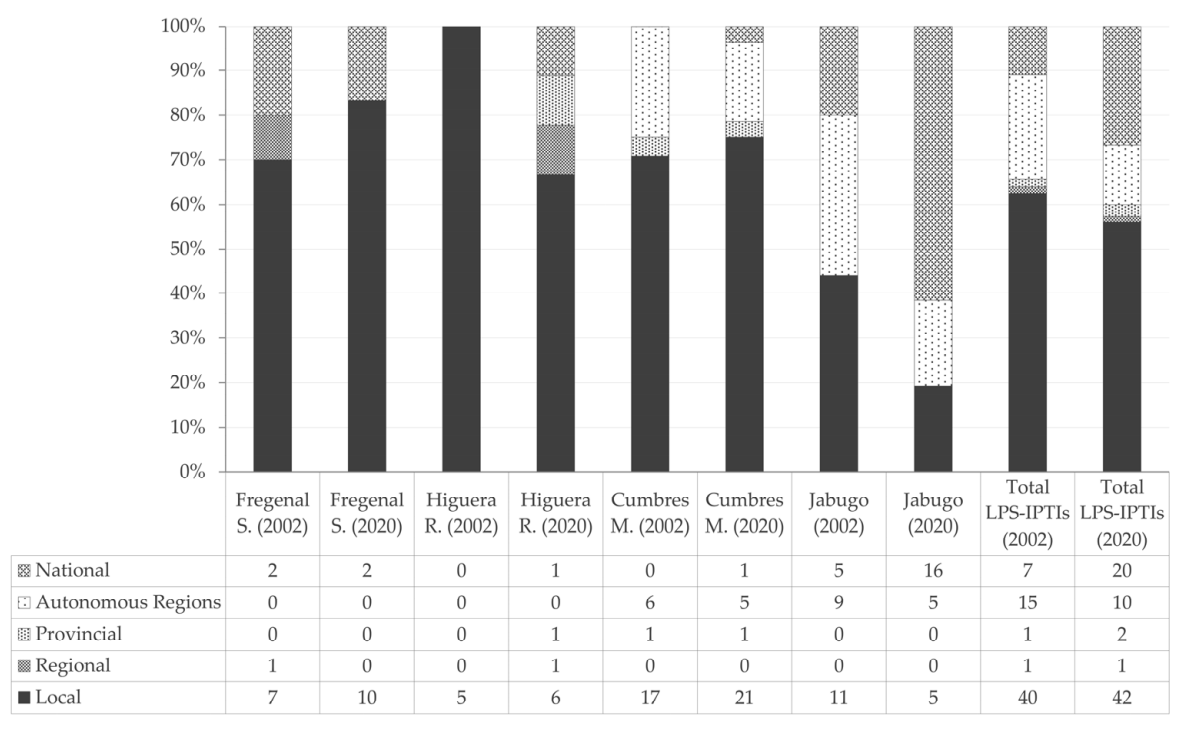


Figure 8. Company headquarters (2002 and 2020). Source: [80,81,94,95]. Authors own elaboration.

Through the RIBER, the marketed production of Iberian hams and shoulders (hereinafter H&S) is obtained in each of the LPS-IPTIs (2019). In total, 2,068,347 pieces of Iberian H&S were sold, consisting of 16.30% of the total Spanish production, as shown in Figure 9. Fregenal de la Sierra was the LPS-IPTI that sold the most, i.e., 43.91% of the total produced by the four LPS-IPTIs analysed in this study, followed by Jabugo (37.43%), Higuera la Real (14.27%) and Cumbres Mayores (4.39%). When analysing the qualities of the products marketed, the results changed substantially. Fregenal de la Sierra provided 79.21% (or 8.26% of the Spanish national market share) of mainly commercialised H&S of lower quality to the market, whereas Higuera la Real catered for 91.92% (or 0.76% and 1.02% H&S respectively) of 100% Iberian acorn-fed products of the maximum quality. On the contrary, Jabugo sold 56.28% of 100% Iberian acorn-fed H&S (45.90% of the Spanish national market share), with bait hams and shoulders falling to 28.51%. The most balanced sales in terms of quality

were shown by Cumbres Mayores, that sold the highest volume of 29.89% of acorn-fed H&S that was 100% Iberian.

Table 6. Classification of LPS-IPTI companies in terms of production-related and economic criteria (2002–2019) (*).

Variable	Range	Fregenal de la Sierra		Higuera la Real		Cumbres Mayores		Jabugo	
		2002	2019	2002	2019	2002	2019	2002	2019
Production-related criteria: volume of production (1) (sacrifices, pieces, size)	<500 pigs slaughtered, <2000 pieces, <50,000 kg (micro-sized company)	1				1			
	501–3000 pigs slaughtered, 2001–12,000 pieces, <300,000 kg (small-sized company)	1				4		4	
	3001–10,000 pigs slaughtered, 12,001–40,000 pieces (medium-sized company)					1		8	
	10,001–50,000 pigs slaughtered, 40,001–200,000 pieces (large-sized company)			3		2		6	
	>50,001 pigs slaughtered, >200,001 pieces (macro-sized company)	1						2	
	Total number of companies with available data	3		3		8		20	
Economic criteria: total assets (2)	<2 million € (micro)	4	5	1	2	8	11	7	6
	2 a <10 million € (small-sized company)	1	3	4	3	6	5	12	8
	10 a <43 million € (medium-sized company)	1	1		2		1	5	7
	<43 million € (large-sized company)	1	1						4
		Total number of companies with available data	7	10	5	7	14	17	24

(*) Data from 2002 correspond to the 2000–2001 season. Data for 2002 were taken from Q1. Source: [81,94,95]. Authors own elaboration.

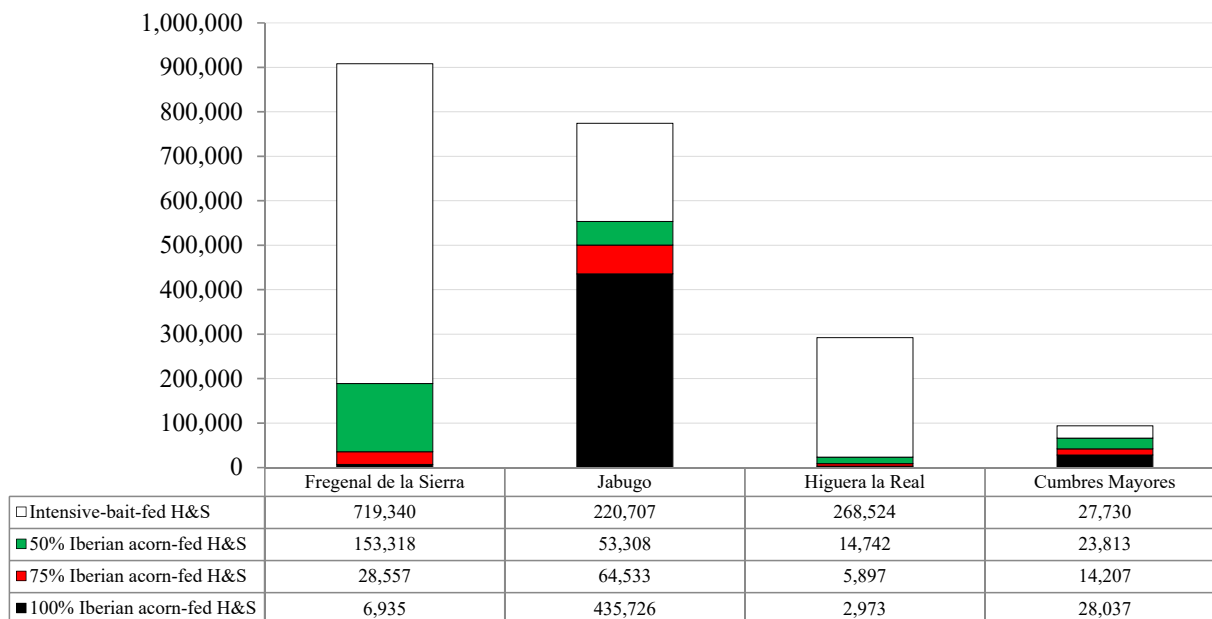


Figure 9. Hams and shoulders market in the four LPS-IPTIs in 2019. Source: [82]. Authors own elaboration.

Following the organisational criterion, namely employment, as per Table 7, out of 31 companies in 2002 (49.21% of the total), small-sized (67.74%) and micro-sized (22.58%) companies predominated, while there were few medium-sized (6.45%) and large-sized

(3.23%) companies, with only one of this type being located in Jabugo. In 2020, micro-sized enterprises predominated (66.66%), which were the most important in all the LPS-IPTIs, except in Jabugo (36.00%). Small-sized companies represented 26.66% of the total, being the most important in Jabugo (52.00%). Medium-sized companies only appeared in Jabugo (8.00%) and Fregenal de la Sierra (8.33%). The largest companies were located in Jabugo (4.00%), where currently (2021) three of them operate.

Table 7. Range-size classification of companies in the LPS-IPTI according to the organisational criterion (employment) (2002 and 2019) ⁸.

Variable	Range	Fregenal de la Sierra		Higuera la Real		Cumbres Mayores		Jabugo	
		2002	2019	2002	2019	2002	2019	2002	2019
Organisational criterion: employment	<10 employees (micro-sized company)	1	10	0	7	5	24	1	9
	10–49 employees (small-sized company)	1	1	4	2	3	4	13	13
	50–249 employees (medium-sized company)	1	1	0	0	0	0	1	2
	≥250 employees (large-sized company)	0	0	0	0	0	0	1	1
	Total number of companies with data available	3	12	4	9	8	28	16	25

⁽¹⁾ Data from 2002 were taken from Q1 and Alimarket, and data from 2019 were retrieved from SABI database, and estimates from the 2002–2019 series, since data from 2020 were still unavailable during the preparation of this article. Source: [81,94,95]. Authors own elaboration.

Taking as a reference the average employment by size and type of activity in 2002 and 2019, as indicated in Table 8, among micro-sized enterprises, ISs generated the most employment, although they are exceptional and even did not exist in 2002. However, the average employment rose in SFHDs and HDs between 2002 and 2019. ISs also generated the most employment among small-sized companies. Among medium-sized companies, ISs again employed the most, yet they, as well as SFHDs, declined in terms of average employment between 2002 and 2019. There is only one large IS, where the average employment also declined in 2019 compared to 2002.

Female employment, as detailed in Table 8, in 2002 in all range of companies and types of activity stood at approximately 30.00% except in the HDs, where it fell to 20%. Except in micro-sized SFs and small-sized SSs, in the rest of the ranges and types of activity an average fall in female employment occurred in 2019, which remained over 25.00% in IS SMEs.

As shown in Figure 10, taking the variation of employment in two types of companies, namely small-sized SFHDs and medium-sized ISs, between 2009 ⁹ and 2019, it is observed how the international economic crisis provoked a generalised fall in employment in large companies, with a similar trend both in terms of male and female employment. However, while the latter stagnated, male employment tended to grow. In 2019, male employment declined by –40.35%, whereas female employment declined by –61.70%. Overall, it can be observed that the medium-sized companies were more stable initially, which resulted in the decline of male employment only at the end of the crisis when male employment declined by –61.90% between 2014 and 2015, with a fluctuation between 2009 and 2019 of –8.88%, whereas female employment experienced somewhat greater stability (28.57% between 2014 and 2015), with a fluctuation of 15.38%.

Moreover, as detailed in Table 9, there were differences in industrial employment between the municipalities, with only Jabugo registering labour specialisation (70.35% of employment in December 2019), which was also important ($\leq 20.00\%$) in Cumbres Mayores and Higuera la Real. When analysing the weight of employment in IPTIs over total industrial employment, this was higher than 100% in Jabugo and approximately the

same in Cumbres Mayores, given the development of LPSs. The employment at LPS-IPTIs stood at 49.20% in Fregenal de la Sierra and at 36.73% in Higuera la Real.

The evolution of the unemployment rate between 2006 and 2019, indicated in Figure 11, shows the consequences of the international economic crisis as of 2008, affecting Jabugo above the rest, which went from an unemployment rate of 17.50% in 2007 to 29.89% in 2009 and reached 35.94% in 2014, while the rest of the LPS-IPTIs followed the same trend. Jabugo also registered the latest recovery, remained unstable and did not reach pre-crisis values.

Table 8. Average employment by size and type of activity and % of female employment (2002 and 2019).

Activity	Range	2002	2019	% of Female Employment	
				2002	2019
SF	Micro	4	3	33.33	33.33
	Small				
	Medium				
	Large				
SFHD	Micro	3	5	33.33	23.07
	Small	23	27	33.96	12.87
	Medium	86	52	33.00	21.73
	Large				
HD	Micro	2	3	20.00	0.00
	Small				
	Medium				
	Large				
IS	Micro		7		14.29
	Small	26	33	31.68	26.79
	Medium	111	86	29.19	20.93
	Large	334	289	29.91	27.77
SS	Micro				
	Small	21	26	35.29	35.29
	Medium				
	Large				

Source: [81,94,95]. Authors own elaboration.

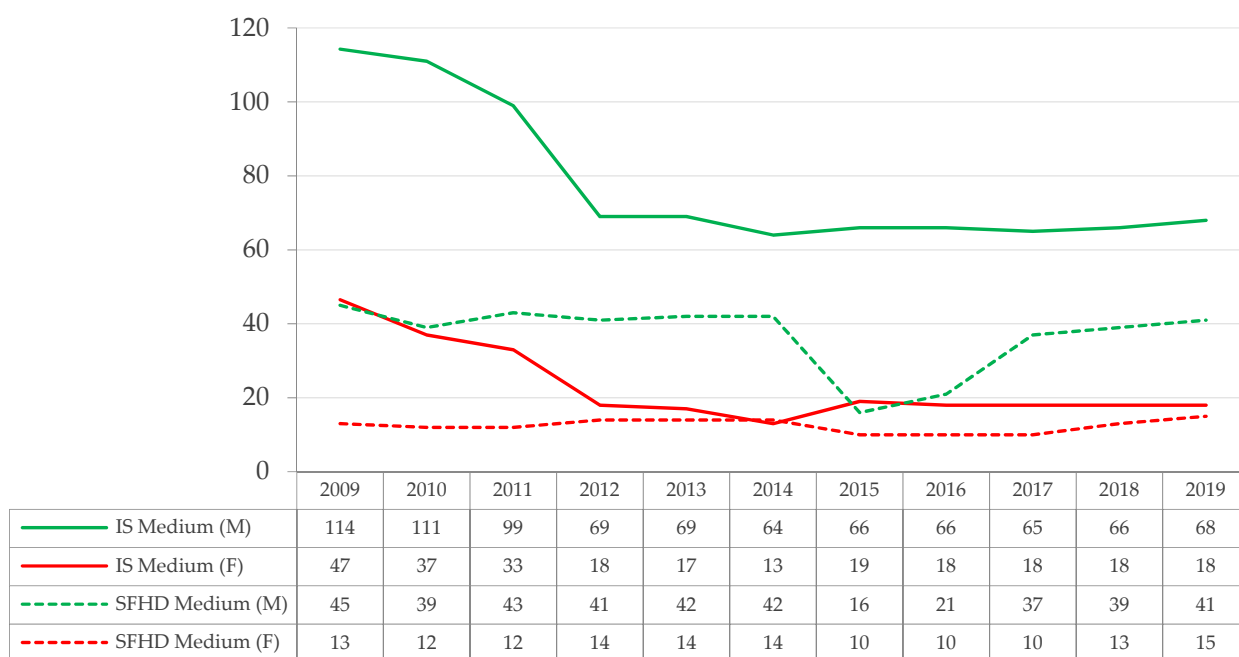
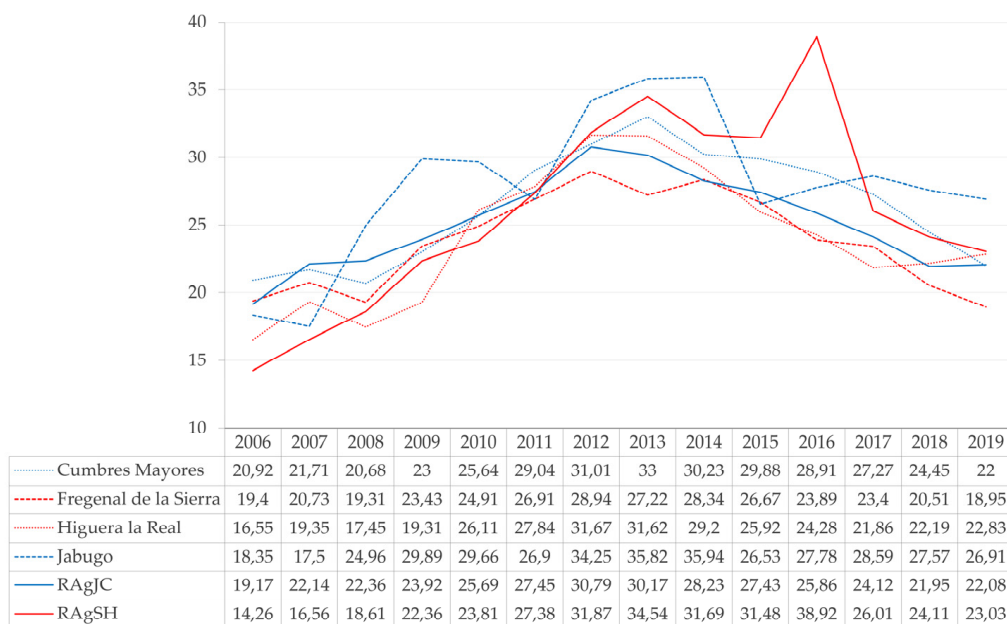


Figure 10. The evolution of male and female employment between 2009 and 2019. Source: [81]. Authors own elaboration.

Table 9. Employment specialisation in the LPS-IPTI (December 2019).

LPS-IPTI	No. of Companies, Total	Industrial Companies, Total	% of Industrial Companies	% of IPTI over Total No. of Industrial Companies	% of Industrial Employment over the Total	% of Employment in IPTI over the Total Industrial Employment	Coefficient of Business Specialisation	Coefficient of Job Specialization
Cumbres Mayores	156	28	17.95	100.00	33.61	97.56	48.07 services	35.08 services
Fregenal de la Sierra	164	24	14.63	50.00	17.45	49.20	62.80 services	68.01 services
Higuera la Real	71	17	23.94	52.94	29.87	36.73	45.07 services	51.44 services
Jabugo	151	32	21.19	81.25	70.35	107.71	58.94 services	70.35 industry

**Figure 11.** The evolution of the unemployment rate of the LPS-IPTIs (2006–2019). Source: [102]. Authors own elaboration.

It is necessary to take into consideration the unemployment rate in the LPS-IPTI regions, indicated in Figures 11 and 12, to comprehend its dimension as a whole and due to the generation of LES. In 2006, the unemployment rate was higher than its regional average in Cumbres Mayores and Jabugo, while in Fregenal de la Sierra and Higuera la Real the unemployment rate was below the regional average. The municipalities that were close by to the LPS-IPTI had similar unemployment rates. In 2019, unemployment exceeded the regional averages in Jabugo and Higuera la Real. Although unemployment rates remained high in all the municipalities of the region, Fregenal de la Sierra presented the best results in its region and the unemployment tended to decline in Cumbres Mayores.

Employment is seasonal as the slaughter campaign takes place from December to March; thus, it is possible to analyse the evolution of employment by taking the last month of the campaign, i.e., March, as shown in Figure 13. The evolution of unemployment from 2006 to 2019 [101] can be analysed through indices to establish the influence of the crisis and its effects on the companies. None of the LPS-IPTIs showed the same results as before the crisis, with the highest unemployment level maintained in Jabugo, while it showed more balanced fluctuation in other municipalities (2011 and 2016).

As indicated in Figure 14, considering the evolution of female unemployment between 2006 and 2019, focus was placed on the slaughter campaign since the sausages are made while pigs are being sacrificed; female unemployment was higher in Jabugo and Cumbres Mayores, showing greater inter-annual variations, although data before the crisis were obtained in neither of the two. Nonetheless, female employment somewhat improved in Higuera la Real and Fregenal de la Sierra during the same period.

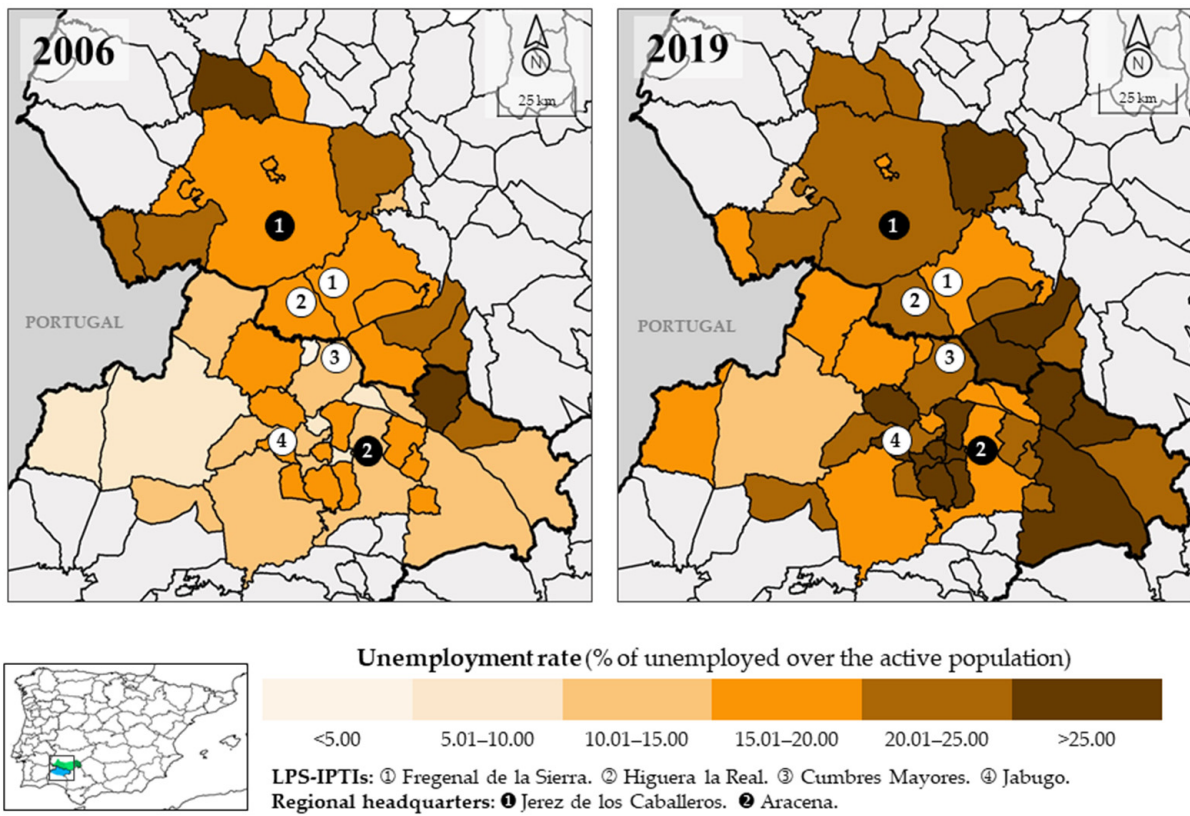


Figure 12. Unemployment rate by municipalities (2006 and 2019). Source: [102]. Authors own elaboration.

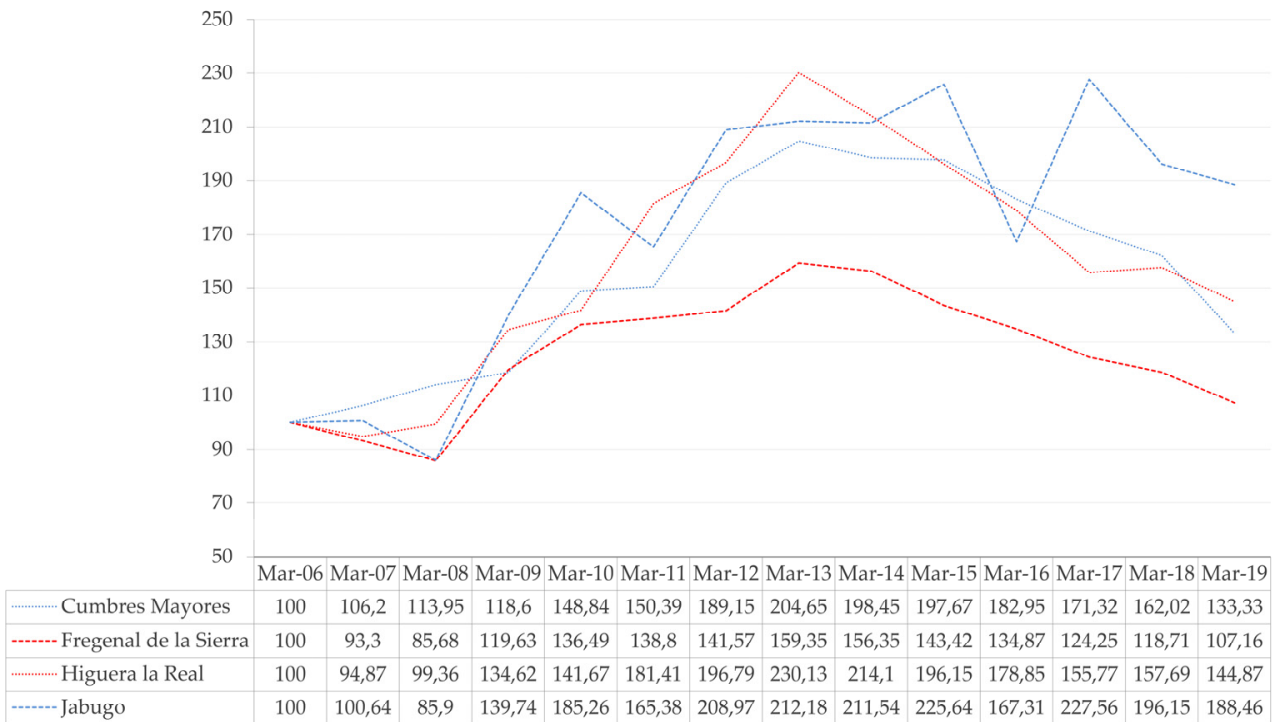


Figure 13. Industrial unemployment registered in the LPS-IPTI (index 100 = March 2006). Source: [101]. Authors own elaboration.

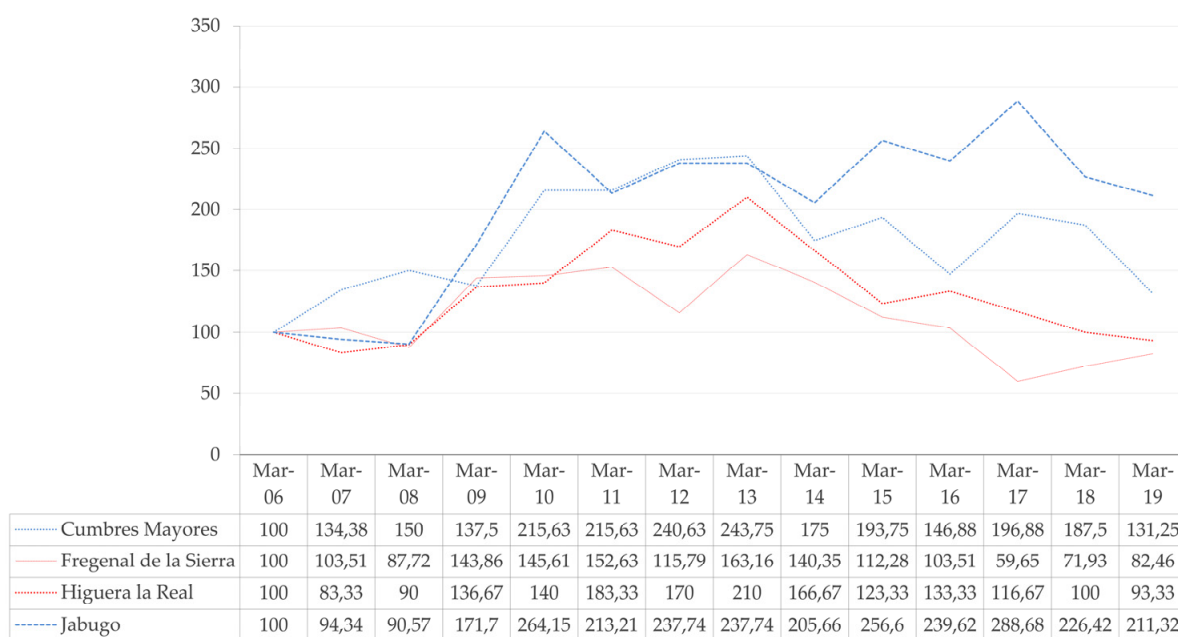


Figure 14. Female unemployment registered in the LPS-IPTI (index 100 = March 2006). Source: [101]. Authors own elaboration.

4. Discussion

This research shows that the LPS-IPTI have transformed in the last two decades reflected by the polarisation of the IPTI and loss of employment in the LPS-IPTI, which both negatively affected demographics.

The agro-food sector is characterised by its traditional atomisation [41] that is manifested in the LPS-IPTI. In 2002, the Iberian pig sector went through an expansive cycle [110], also known as the so-called “Iberian bubble” [75], which resulted in a growth in both the number of industrial establishments and companies [73]. In the studied period, the number of companies and establishments increased. A priori, this was due to the natural dynamics of activity in a specialised territory with the importance of primary factors and non-relocatable activities, as well as a tendency to agglomerations [66,67]. However, this expansion happened also because of the search for a recognisable brand as competitive, e.g., as in the case of Jabugo, and comparative, such as accessibility advantages [61]. Nonetheless, these changes would only explain the layoffs, not the termination of activity due to the considerable transformation that was, for instance, observed in Guijuelo [75].

On the other hand, the registrations of new establishments and companies were concentrated in the expansive period from 1997 to 2007 (56.00%), while decreases coincided with the international crisis from 2008 to 2014 (50.00%), as witnessed in Guijuelo and the Sierra de Huelva [42,75]. These transformations were more important in the LPS-IPTIs with the highest industrial concentration, Jabugo and Cumbres Mayores, yet the percentage was higher in Higuera la Real and Fregenal de la Sierra. The greater the dimension, the greater the attraction and dynamism, since concentration will improve performance [66].

Vertical segregation, common to other ham productions [111], undergoes a specialisation. Both in 2002 and 2020, SFHD dominated, although it lost its importance in Fregenal de la Sierra and Cumbres Mayores and increased in Higuera la Real and Jabugo, being affected by layoffs and loss of functions, e.g., changing their activities solely to HD. HDs grew the most in the group and were identified with the specialisation due to the increase in demand for noble pieces, the relocation of the supply due to the changes of slaughtering taking place elsewhere and the increase in retail demand and for fresh product (without transformation) through the HORECA¹⁰ channel, which was already present in 2002 and requires comparably low-cost infrastructure [42,60].

The number of activities per LPS-IPTI tended to decrease in Cumbres Mayores, with Higuera la Real having the least diversity. Overall, the specialisation of production was

appreciated at the end of the process, e.g., of HDs, and business strategies were recorded with a progressive purchase of ISs by companies with HDs, also observed in the CB Prosciutto di Parma (hereinafter PdP) [111].

In this manner, business transformations will continue playing an important role in the LPS-IPTI, although qualitative changes are more important than quantitative ones [42]. Four causes of business termination [42] that equally affected all LPS-IPTIs were identified, as follows:

- Natural business mortality due to lack of generational change and retirement [112] was frequent among SFHDs, family-owned and social enterprises, especially in micro-sized and small-sized companies of local capital. This internal cause was widespread in the sector [84] and reflected by the termination of activities of longer-standing companies that disappeared throughout the period, with the international economic crisis not having a special impact;
- Business mortality due to low competitiveness as a result of their size, especially in the case of micro-sized and small-sized enterprises, a low level of innovation and simple organisational structure [49]. Local companies were unable to adapt to market changes due to the increased cost of premium materials and competition through automated production [84]. It was the least common process and it occurred mainly before the international economic crisis;
- Business mortality due to indebtedness and economic unfeasibility that resulted from the oversizing of decapitalised companies because of long amortisation periods and considerable capital immobilisation [59,84]. A significant decline over the expanded period led to seeking foreign investment or loans that, despite low-interest rates, required short amortisation periods and strong guarantees due to the difficulties of investing in specific assets [83,84]. While dominated by small businesses, these were companies of all sizes and seniority, mostly of local capital and a simple organisational structure that invested to grow, e.g., slaughter lines, processing and storage capacity, rather than to increase their efficiency [42]. Activity ceased as a direct consequence of the international financial crisis as of 2008, when the drop in sales directly affected the cash flow that produced liquidity tensions and made it difficult to pay creditors [84]. These companies were also affected by external decisions, such as imposed prices by distributors, the irruption in the market of distributor brands and unfair competition [42];
- Business mortality in business groups, as a result of the merger strategy, resulting in elimination of brands. Before the crisis, it affected only one local family-owned business [42], yet it began to be a common practice in corporate networks in the post-crisis scenario due to the opening of legal actions that eliminated the brands and the companies involved.

The “localized and specialized production processes” [45] in the LPS-IPTI led to the relocation and purchase of companies, which coincided with the crisis of the companies and the termination of activities, resulting in diverse circumstances [42] that include the following:

- Acquisition by foreign business groups, most common in medium-sized and large-sized companies, took place to establish themselves in the LPS-IPTIs that originated from: (1) the Iberian pig sector with horizontal integration with the expansion of the range within the Iberian products; (2) from the white pig sector with diagonal integration, diversifying the range with Iberian products; and (3) investment companies outside the sector through venture capital, pirate expression of international capital [47] and that had links with large retail linear distribution, acting as agents of the globalised process [47,113]. This process occurred in the four LPS-IPTIs, but especially in Jabugo;
- Acquisition by foreign business groups already present in the LPS-IPTI as it corresponded to business strategies of expansion, concentration or absorption of competitors to control the production process, later releasing part of the assets which they

sold to other foreign companies. Acquisitions affected medium-sized and large-sized companies in Jabugo and Cumbres Mayores, and were related to divestments in the banking sector;

- Local companies with internal changes that affected ownership were mostly common in micro-sized and small-sized family-owned companies that changed ownership, name and legal status due to generational changes, sometimes due to re-founding. They were present in all LPS-IPTIs;
- Newly created local companies acquired facilities from other companies due to their termination of activity. They were more common in Cumbres Mayores than in other municipalities.

Company registrations characterise the Spanish agro-food sector [49] and were very frequent in IPTI [75]. There were two types of layoffs [42], as follows:

- Medium-sized and large-sized foreign companies that came mostly outside the Iberian pig sector, e.g., white pig sectors or investors, and were linked to retail distribution [39] that built big HDs, sometimes SFHDs. This process, present in all LPS-IPTIs, particularly in Jabugo, corresponded to a generalised process of relocation or relocation of non-relocatable industries such as wine [114] or PdP [111]. Foreign companies nearly always acted in the same manner [113], namely, they created links with internal companies, relied on automatised production, purchased a product with their own or distributor brand and, finally, controlled the means of production. While the mass production was of standard, cheap and poor quality products, this approach also allowed them to create segmented gourmet products;
- Local micro-sized companies that emerged from livestock diversification, responding to an upward vertical integration, which sought to create value and productive efficiency [84,115]. They were family-owned and social enterprises, characterised by their low capitalisation (HD, SFHD and SF) which resulted from the natural dynamics of the sector and was present in all LPS-IPTIs.

The increase in the number of establishments per company responded to the construction of new HDs or their expansion due to the tendency to store reserves during the crisis and provide services to other companies by the use of available machinery; however, this only occurred in SFHDs when new industrial facilities were created. The analysis is complex if the link between companies and the existence of corporate networks is considered.

The growing importance of business groups produced two effects present in the four LPS-IPTIs, especially in Jabugo, namely:

- The importance of the loss of family-owned and social enterprises in the LPS-IPTIs presented a lack of efficient organisation of the company in favour of companies with efficient functional structures [89]. The efficient organisational structure was particularly difficult to reach in traditional companies since there is a link between the choice of advisers and the hostility of the local industry [116];
- The displacement of the decision-making and strategy design centres [117] due to the location of the headquarters outside or due to subordination within complex organisations generated a sector with little autonomy. Although the companies retained their character, their brands were preserved due to the effect of the family signature on consumer preferences [118] in the standardisation processes. There was an uprooting of the productive system [39] in which external hierarchies succeeded [51] and capital and corporations prevailed [46,47]. Accordingly, only micro-sized and small-sized companies continued to maintain a strong connection with the territory they were established in [84,115].

The LPS were constituted, with exceptions, around SMEs [15] that dominated among the LPS-IPTI, although due to the regulatory restrictions in the 1980s the least competitive terminated their activities [49,60]. These continued to prevail in the LPS-IPTI, though with a tendency to concentrate production in medium-sized and large-sized companies, especially in Jabugo and Fregenal de la Sierra, as shown in Figure 15.

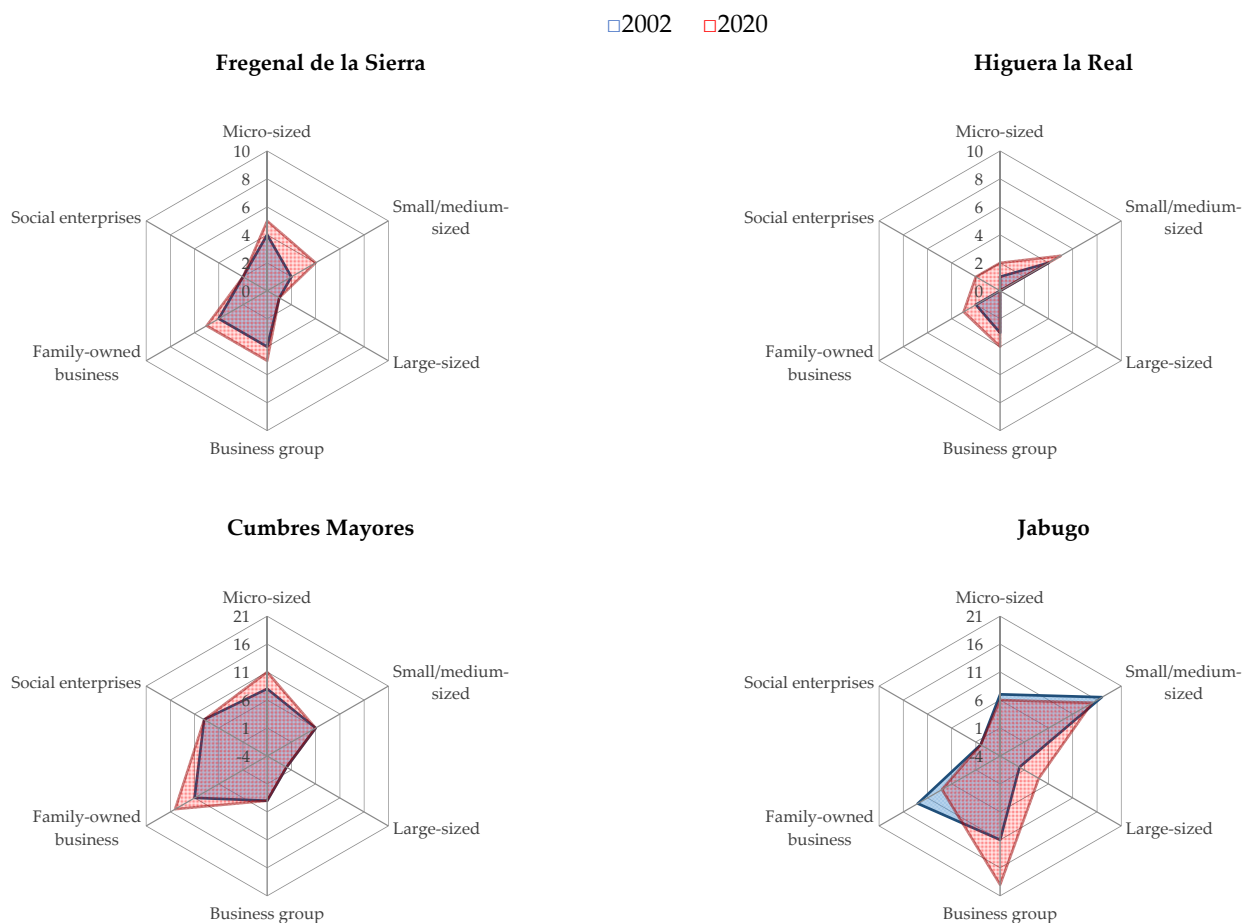


Figure 15. Changes in the size and type of companies (2002 and 2020). Source: Q1 [81,95]. Authors own elaboration.

The entry of large-sized companies has led, in general, to an increase in production without a quality brand, which has become a weak point for the traditional industry, as it has also been observed in PdP [113,119], generating changes in production [42,45,52]:

- **Standardisation:** to deal with retail distribution, low-priced [44] and massive products, and asymmetric relationships, generalised by loss of added value in favour of retail distribution that concentrated most of the sales [120]. Therefore, it became a model of dependence on production processes by large transnational food corporations [46,47], especially from the white pig sector and investors, that sought to compete in prices by increasing the standard product of noble pieces (Iberian 50% bait), sausages and fresh meats. This process dominated in Fregenal de la Sierra and Higuera la Real and was increasing in Jabugo. Standardisation leads to livestock intensification that produces changes in livestock production areas outside the SW [65];
- **Differentiation:** specialisation focused on premium quality, i.e., 100% acorn-fed Iberian pigs, was subject to production fluctuations due to natural conditioning factors. Differentiation, importantly, generates a context of “food chains based on notions of quality, territory and social integration (. . .) combining the attributes of product, process and place (3P)” [15] (p. 116) that links with the LPS-IPTIs and the search for endogenous local development and the development of CB. This process has also been witnessed for wines [121] and PdP, yet it weakens traditional industry [119]. This process was noted in the production of some companies in Jabugo and Cumbres Mayores; however, it was not purely a characteristic of small-sized local companies, yet also of large ones with territorial roots, as it allowed them to be more resistant to the crisis.

Traditional IPTIs demanded a high workforce due to the scarce use of machinery focused on the incorporation of cold and mechanical processes, mainly aimed at improving

working conditions rather than substitution, which meant that micro-sized and small-sized companies generated little, yet more stable, employment around SFs, SFHDs and ISs. Traditionally, productivity has been linked to the hiring of additional seasonal personnel or paying overtime. However, the multiplication of establishments, changes in activity, specialisation and the entry of foreign companies did not increase employment. The influx of new companies in the sector has led to the recruitment of labour from traditional companies, registering some mobility that is almost absent in the traditional company, and a tendency to retain more qualified workers [60].

Employment was higher in ISs and SFHDs where family-owned businesses prevailed. However, the growth of HDs reduced direct employment, regardless of their size. Employment was concentrated in the companies' places of origin where the slaughter takes place. Thus, there was a progressive regression of stable employment given the specialisation and elimination of functions. On the other hand, the LPS-IPTIs that produced the most did not generate the most employment, since this depended on the type of company and activities, condemning the subsidy to the more specialised LPS-IPTIs, e.g., in Jabugo and Cumbres Mayores, which had the lowest unemployment rates noted in 2002. Furthermore, the effect was not limited to LPS-IPTIs, as it also affected the regions where they were founded with traditional LES [70,72,73] where a high degree of commuter travel was generated [122], principally in Jabugo, which employed more industrial workers than there were living in the municipality.

Traditionally, employment was conditioned by a marked seasonality linked to the season by the climate and raw material (the higher the quality, the greater the seasonality) that led to the proliferation of fixed-discontinuous and temporary contractual employment, above the standard. Stable treatment, generating complex labour processes, namely the combination of agricultural activities, was in decline, as well as staff rotation and recruitment of crews, among others. The new companies have become seasonally adjusted by betting on a product available all year round, resorting to freezing noble pieces or the production of white pork products, yet none of them generated more local employment.

In a labour market with exclusivity [123] such as that seen in the LPS-IPTI, mainly in Jabugo, the workforce is specialised and is mono-sectoral, which produces dependence on the IPTI and is sensitive to crises. Between 2006 and 2020, Fregenal de la Sierra, Higuera la Real and Cumbres Mayores showed high initial unemployment rates that continued to increase until 2012–2013 and then fell. In Jabugo, the progressive termination of activities in IPTIs, diversification of activities towards commercial and hospitality activities, divestment of public and private companies and the conversion of ISs and SFHDs into HDs, commenced the loss of employment, maintaining higher unemployment rates at approximately 30% between 2012 and 2014, and higher than 25% from 2009 to 2019, with greatly marked ups and downs (2011 and 2015). Only the creation of new industries such as construction and services became a factor for increasing employment.

The loss of employment led to the feminisation of unemployment, as has been observed in Guijuelo [85]. The men in the IPTI carried out the slaughter, cutting and salting of hams, while the women dedicated themselves to the section of fresh meat and the manufacture of sausages [85] that became irrelevant with activity transformation to HD.

On the other hand, the rigidity of this mono-specialised labour market expelled labour since it was unable to integrate local professionals, especially those trained abroad; thus, they did not return to their place of origin into the labour market system. This generated migratory processes, apart from a perverse development process characterised by the extraction of rural income for the training of young people in the cities that will not return to their areas of origin [60].

Most of these transformations that occurred were due to processes initiated during the growth phase until 2007 [42], namely: (1) indebtedness in secondary capital circuits [124] that advocated for closing when advanced payments could not be made; (2) alliances with retail distributors that demanded standardised [39], low-priced products of the distributor's brand [46] with a product that was difficult to sell during the crisis; (3) the

search for foreign investors as business participation and the entry of capital from outside the territory in the sector that took over the productive system when companies entered into crisis; and (4) private and public divestments amid the crisis that sold establishments at bargain prices.

As the result, a process of business concentration begins in a deprived sector [49] where large-sized foreign companies come into play and use economies of scale [42] to: (1) absorb competitors and control the production chain; (2) group into larger productive units, as has been seen in PdP [119]; (3) expand its range of products by incorporating the Iberian pig with white pig industries or another LPS-IPTI of Iberian pig industries; (4) invest in a projected sector in a relocation process [39], which began in 1976 in Jabugo and became much more common as of 1995 also in Fregenal de la Sierra and Cumbres Mayores [64]; and (5) access international markets.

As a consequence, these processes resulted in: (1) territorial uprooting and loss of the local productive ties of the activity [18] (very noticeable in Jabugo), in LPS-IPTIs due to the consolidation of global chains [125]; (2) social capital decline with the loss of employment and the value of know-how, as has also been observed in the PdP, as local skills lost importance [51]; (3) de-differentiation of the standardised product and prevalence of low-quality production of little added value, observed in Fregenal de la Sierra, Higuera la Real, and Jabugo, as well as loss of the own brand in favour of the brand of the distributor; (4) appearance of fraud in Iberian products, especially affecting Jabugo and Fregenal de la Sierra; and (5) increase in external hierarchy due to increased competitiveness of large companies and worsening situation of small ones.

These processes have encouraged local companies to position themselves in front of external companies [126] that have been gaining importance in the sector while local actors were losing their active presence [25]. Traditional, family-owned and smaller local businesses could only guarantee their survival with a commitment to quality, since there is no direct size-quality relationship, as has been pointed out also for the PdP [119]. The LPS-IPTI is learning about the generation of “production worlds” [127], also identified for wine productions [128], when some compete for prices and others for quality, passing the productions through various phases from the local to the international markets [129]. This supposes a polarisation between small-internal and large-external companies, which generate a loss of ownership in the LPS-IPTI.

5. Conclusions

The formation of the LPS-IPTI was intended as a development alternative in peripheral rural spaces; however, internal and external factors led to transformations of business, organisational as well as productive structure.

The territorial base of the activity does not allow industrial relocation; therefore, the business structures do not undergo quantitative changes and focus on qualitative ones. There has been a productive specialisation (simplification) towards the production of noble pieces (end of the process) that are of the highest added value, but which require less investment and generate less employment.

Whereas the financial and economic crisis has influenced some of the changes in the LPS-IPTI, some of the causes were already present. The part of the traditional sector lacks competencies necessary to modernise, improve its production structure and take advantage of synergies to preserve its territorial base, consequently betting on growth based on indebtedness, involvement of external shareholders or through market access strategies. These are the companies that are unlikely to overcome the crisis and will be acquired by external companies, compared to companies that bet on tradition and thus quality.

There is a progressive polarisation of the sector, in micro-sized and small-sized traditional local-based companies and large-sized modern companies with external links. While the SMEs continue to dominate in the LPS-IPTI, most of the production is concentrated in medium-sized and large-sized companies where standardised production predomi-

nates. So-called “production worlds” are generated where some companies bet on quality, whereas others focus on prices.

While the seasonality of employment decreases, the employment is overall in decline and not recovering its values before the crisis. The capacity to generate employment is lost, particularly with the termination of activities that need more workforce, and unemployment especially affects rural women. External actors become empowered as they control the production process. However, the process of business and territorial concentration continues taking place in the territory resulting in the loss of local productive structures and social capital. There is a risk of perceiving the territory only as a name and not as a value. While the territory has not disappeared, it has changed its headquarters, assuming an alienation of the LPS-IPTI, enshrined in Jabugo.

The study of the political-institutional dimension and the cooperation-collaboration relations around CB are limitations of this study. In this sense, future analysis requires addressing the role of stakeholders in the researched processes and the importance of cooperation-collaboration relationships between them, as well as whether the importance of CB is present in the analysed changes. In addition, it is necessary to deepen the study of the organisational structure of the company and its propensity to change as well as its strength while facing the crisis, depending on internal and external factors. Finally, the findings concerning female unemployment open a line for further research of gender in the given context.

Author Contributions: Conceptualization, A.P.-G., G.Š. and F.J.G.-D.; methodology, A.P.-G., G.Š. and F.J.G.-D.; validation, A.P.-G., G.Š. and F.J.G.-D.; formal analysis, A.P.-G., G.Š. and F.J.G.-D.; investigation, A.P.-G., G.Š. and F.J.G.-D.; resources, A.P.-G., G.Š. and F.J.G.-D.; data curation, A.P.-G., G.Š. and F.J.G.-D.; writing—original draft preparation, A.P.-G., G.Š. and F.J.G.-D.; writing—review and editing, A.P.-G., G.Š. and F.J.G.-D.; supervision, A.P.-G., G.Š. and F.J.G.-D.; project administration, A.P.-G., G.Š. and F.J.G.-D. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The databases used in this research are referenced as sources: [57,81,82,95–102,109].

Conflicts of Interest: The authors declare no conflict of interest.

Notes

- ¹ The period of autumn and winter during which Iberian pigs eat acorns in the “dehesas”.
- ² The generic term “Iberian ham” includes shoulders. Three qualities are distinguished for hams, shoulders and loins, namely “Iberico de bellota”, “Iberico de cebo de campo” and “Iberico de cebo” (intensive), and the variable racial purity is introduced (100% Iberian, 75% Iberian, 50% Iberian) [58].
- ³ The Agrarian Regions (hereinafter RAg.; based on “comarca agraria”) were established by the regionalisation of the Ministry of Agriculture (1978). This regionalisation made it feasible to use the same criterion for the state as a whole, grouping municipalities by their common and uniform natural, economic and social characteristics.
- ⁴ Boix & Galletto [70,71], Juste & Fernández [73] and Trullén [72] refer together of Guijuelo-district of Salvatierra-Ledrada (as Local Employment System in the first case, as industrial districts in the other two), while Seva-Larrosa [76] considers 46 municipalities, with a center in Guijuelo, as the Food Industrial District (hereinafter FID).
- ⁵ Boix and Galletto [70] and Trullén [72] jointly consider Higuera la Real and Fregenal de la Sierra (see previous note), while Seva-Larrosa [76] considers Fregenal de la Sierra as the FIA of five municipalities and Higuera la Real of four, noting that three municipalities from Huelva are included in this Extremadura FID).
- ⁶ Seva-Larrosa [76] considers Jabugo as FID of three municipalities.
- ⁷ The fixed assets of production due to the curing time of noble pieces [84] advises against using operating income, which is why this indicator is not being considered.
- ⁸ The period of autumn and winter during which Iberian pigs eat acorns in the “dehesas”.
- ⁹ 2009 is taken as the reference year in this case due to inexistent continuous series of date of the previous years.

¹⁰ HORECA stands for hotels, restaurants and coffee places, and is standardised in Spanish (esp. “hoteles, restaurantes, cafeterías”).

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