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The origins of economic growth and regional income inequality in South-West Europe 1870-1950

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Abstract

This study focuses on South-West Europe, an area comprising France, Italy, Spain and Portugal, to evaluate inequality in regional income between 1870 and 1950. To do this, information on a decadal basis on regional population and Gross Domestic Product (GDP) for 171 regions (84 French départements, 22 Italian regioni, 18 Portuguese distritos and 49 Spanish provincias) has been collected. Regional inequalities increased between 1870 and 1910 but subsequently tended to flatten out through until 1950. In the first period, regional disparities increased mainly driven by a handful of French and Spanish regions in northern France, such as the Paris basin, Catalonia, the Basque-Country and northern Italy. In the second period, inequality flattened out, driven by the incorporation of new regions on the path of modern economic growth. The study also shows the evolution towards a bimodal, polarized pattern of regional income distribution in 1910-1950 with two convergence clubs. The richest regions were clustering in northern France, the Paris basin and the north of Italy. Meanwhile, most of southern Italy and the vast majority of the Spanish and Portuguese regions already occupied the bottom positions in the income distribution ranking. This points to the emergence of the core-periphery pattern that characterizes much of South-West Europe today.

Keywords: Economic History, Regional inequality, France, Spain, Italy, Portugal

JEL Classification: N93; N94; O18; R11.

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The origins of economic growth and regional income inequality in South-West Europe 1870-1950

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1.- Introduction

More than sixty years ago, Simon Kuznets raised a fundamental question in economics: “Does inequality in the distribution of income increase or decrease in the course of a country’s economic growth?” Since then, the development of national accounting and rapid economic growth after World War II (WWII) have inspired several theoretical and applied studies. However, most of these have placed most of the emphasis on production, leaving aside distributional aspects. Paradoxically, few have followed Kuznets’ final suggestion to shift away “from market economics to political and social economy”¹.

Despite outstanding improvements in living standards, personal and regional income inequality still remain major challenges. As regards regional disparities, the EU has devoted an enormous amount of funding to subsidising backward regions and thereby counteracting market forces². Even so, territorial cohesion remains a major challenge

¹ Simon Kuznets, “Economic Growth and Income Inequality”, *American Economic Review* 45 (1955), 1-28. Robert M. Solow, “A Contribution to the Theory of Economic Growth”, *The Quarterly Journal of Economics* 70 (1956), 65-94. N. Gregory Mankiw, David Romer and David N. Weil, “A Contribution to the Empirics of Economic Growth”, *The Quarterly Journal of Economics* 102 (1992), 407-437.

² The European Regional Development Fund and the European Committee of the Regions were created in 1975 and 1994.

and imbalances persist. We are regularly reminded of this by the Eurostat Regional Yearbooks which identify a great divide between the rich north-west of Europe and the much poorer southern and eastern parts of the continent.

Having said this, to understand the current spatial distribution of income, it is necessary to take a look back into the past. A study of European history can shed light on what have constituted the regional dynamics since the origins of what Kuznets labelled modern economic growth (MEG). Cross-country comparisons have already shown us that industrialisation did not occur evenly. Few states, except perhaps Belgium, were able to replicate British industrialisation, which was essentially based on the textile, metallurgy and coal sectors. Yet, what happened in Britain or Belgium was fundamentally based on their respective factor endowments and natural resources, such as the abundance of coal³.

Furthermore, British industrialisation was not a uniform process. Its coal, cotton, metallurgy and shipbuilding sectors were concentrated in specific regions that became important poles for development. This spatial distribution of economic activity also exacerbated disparities in regional income. Influenced by Kuznets' previous work, Williamson suggested that inequality in regional income exhibited an inverted U-shaped

³ Simon Kuznets, "Modern Economic Growth: Findings and Reflections", *The American Economic Review* 63 (1973), 247-258. As regards British industrialisation: Phyllis Deane, *The First Industrial Revolution* (Cambridge, 1965); Joel Mokyr, *The Enlightened Economy: Britain and the Industrial Revolution 1700-1850* (London, 2009); Robert C. Allen, *The British Industrial Revolution in Global Perspective* (Cambridge, 2009). Edward A. Wrigley, *Energy and the English Industrial Revolution* (Cambridge, 2010). Sidney Pollard, *The Peaceful Conquest: The Industrialization of Europe, 1760-1970* (Oxford, 1981).

pattern throughout the process of national development, with growing inequality in the early stages, and convergence thereafter⁴.

A regional approach allows us to contrast long-held views with smaller spatial units. In this study, we focus on South-West Europe, an area comprising France, Italy, Spain and Portugal, and evaluate inequality in regional income between 1870 and 1950. To do this, we collect information on regional population and Gross Domestic Product (GDP) for 171 regions. Our main research interest therefore lies at the subnational level.

South-West Europe presents an interesting case study. On the one hand, this area contains a large number of what have been designated as priority regions within EU-28, although it also includes some of the wealthier ones, such as Paris (Seine) and Lombardy. This raises a central question about path-dependence. Furthermore, each of these countries also has its own peculiarities. For example, Northern France followed in the footsteps of Britain and Belgium due to its similar factor endowments and geographical proximity, but these aspects were not very relevant in the ascent of Catalonia, the Basque-Country or northern Italy. This study aims to shed more light on this widely debated subject.

The article is structured as explained below. In section 2, we provide a brief overview of South-West Europe and compare its performance with that of the leading economy, Great Britain/United Kingdom. We then present our data set. In total, we collected

⁴ Jeffrey G. Williamson, "Regional Inequality and the Process of National Development: A Description of the Patterns", *Economic Development and Cultural Change* 13 (1965), 1-84. For an up-to-date study on the causes of regional inequality see Christian Lessmann, "Spatial Inequality and Development. Is There an Inverted-U Relationship?", *Journal of Development Economics* 106 (2014), 35-51.

population and GDP information for 171 regions in South-West Europe, on a decadal basis, between 1870 and 1950. In section 3, following Williamson's hypothesis, we assess inequalities in regional income within South-West Europe and discuss whether this also exhibits an inverted U-shaped relationship in the study period. In general, there appears to be two clearly distinguishable phases. From 1870 to 1910, regional disparities grew, driven by a handful of leading regions in northern France, such as the Paris basin, Catalonia, the Basque-Country, and – to a lesser degree – northern Italy. The inequality in regional income then somewhat stagnated during the interwar and immediate post-war years: 1910-1950. Section 4 describes the different stories of industrialisation within each country in more detail and then section 5 summarises the main findings and presents some conclusions.

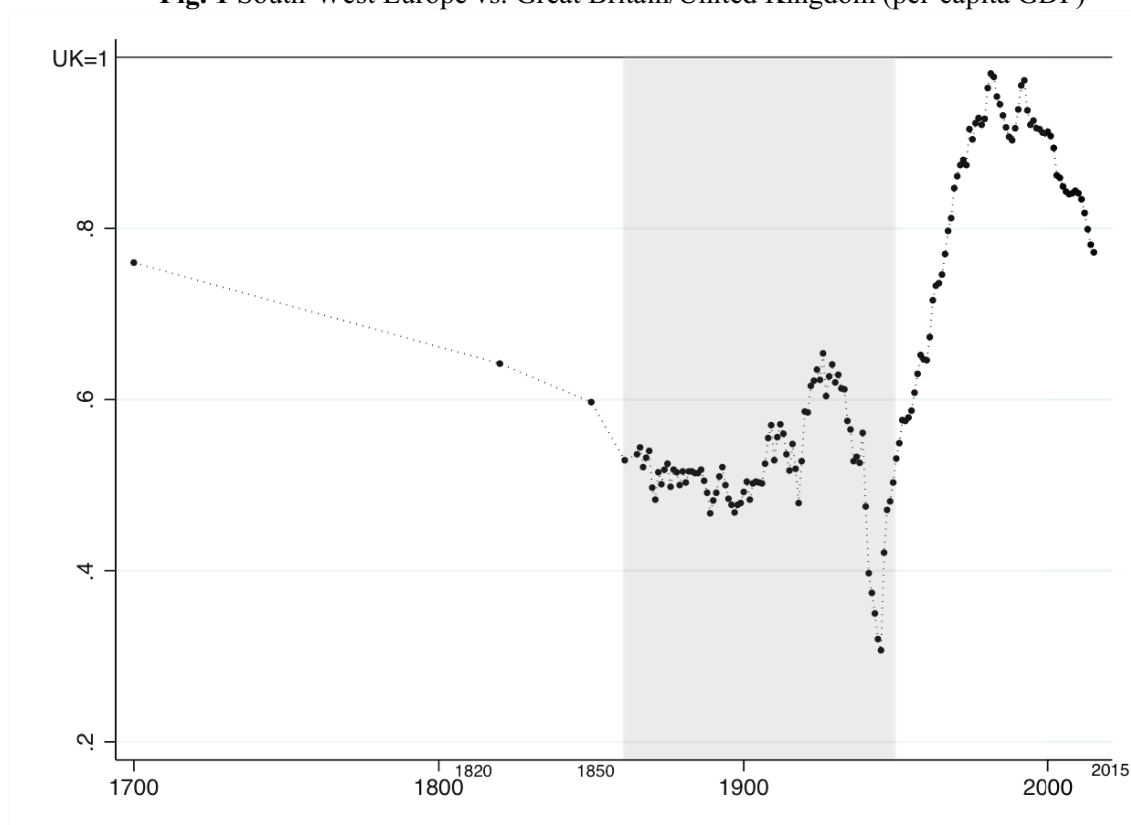
2.- South-West Europe 1870-1950: An overview (and a new data set)

In this section, we present an overview of South-West Europe, which contains France, Italy, Portugal, and Spain. Using Maddison data, figure 1 compares and contrasts per-capita income, measured in 1990 international Geary-Khamis dollars, in South-West Europe with that of Great Britain, the pioneering industrial nation. As expected, the existing gap between these regions widened for most of the 19th century. In fact, the Maddison data suggest that by 1890 per-capita income in South-West Europe was around half of that in Great Britain.

This relative decline came to a halt at around the turn of the century. In the early 20th century, Maddison data point to a reversal in this trend, with a modest catch-up between South-West Europe and Great Britain. This was, however, abruptly interrupted during the interwar years, particularly as a result of the Great Depression, the Spanish Civil

War (1936-39) and World War II (WWII – 1939-45). By 1950, historical estimates suggest that per-capita income in South-West Europe was about half of that in the United Kingdom (UK). Catch-up primarily occurred between 1950 and 1981. This convergence was the result of a combination of rapid economic growth in South-West Europe and only moderate growth in the UK. By 1981, per-capita incomes in South-West Europe had almost equalled those in the UK. However, recent decades have seen a reversal of this trend, with South-West Europe again lagging behind in terms of per-capita income⁵.

Fig. 1 South-West Europe vs. Great Britain/United Kingdom (per-capita GDP)



Source.- <http://www.ggdcc.net/databases/ted.htm>

⁵ For an account of inter-war and post-war economic growth in Western Europe see Charles H. Feinstein, Peter Temin and Gianni Toniolo, *The European Economy Between the Wars* (Oxford, 1997); Nicholas Crafts and Gianni Toniolo (eds.), *Economic Growth in Europe since 1945* (Cambridge, 1996).

As regards the individual countries in South-West Europe, France and Italy could be classified as early followers. Prior to the World War I (WWI - 1914-1918), catch-up between these two and Great Britain was already underway. Spain and Portugal, however, only experienced moderate convergence during the interwar years, but not before. In fact, the Maddison data show that in 1918 per-capita income in these two countries was at less than 40% of that in Great Britain. In general, and in spite of having triggered the industrialisation process, economic growth had remained modest, to say the least, during the second half of the 19th century.

More specifically, French economic growth in the late 19th and early 20th centuries – a period also known as the “*Belle Époque*” - was moderately slow. Even so, population growth prevented per-capita income from stagnating. In Italy, growth accelerated in the “*Giolitti Age*” (1901-1913). Similarly, Spanish economic growth did not reach its full potential until the 20th century. Likewise, Portuguese economic growth before WWI was somewhat poor, with the annual rate being below 1%⁶.

⁶ For France, see Jean-Claude Toutain, *Le Produit Interieur Brut de la France de 1789 à 1982*. Économies et Société (Grenoble, 1987) and Maurice Lévy-Leboyer and François Bourguignon, *The French Economy in the Nineteenth Century: An Essay in Econometric Analysis* (Cambridge, 1990). As regards Italy, Gianni Toniolo (ed.), *The Oxford Handbook of the Italian Economy Since Unification* (New York, 2013); Emanuele Felice and Giovanni Vecchi, “Italy’s Growth and Decline, 1891-2011”, *Journal of Interdisciplinary History* 14 (2015), 507-548. For Spain, Leandro Prados de la Escosura, *El Progreso Económico de España* (Bilbao, 2003); idem, “The Sources of Long Run Economic Growth in Spain, 1850-2000”, *The Journal of Economic History* 69 (2009), 1062-1090; idem, “Spain’s Historical National Accounts: Expenditure and Output, 1850-2015”, *EHES Working Papers in Economic History* 103 (2016), 1-145. For Portugal, Pedro Lains, “Catching-up the European Core: Portuguese Economic Growth, 1910-1990”, *Explorations in Economic History* 40 (2003), 369-386.

In sum, the economic divergence between South-West Europe and Great Britain observed before WWI eventually slowed down after the “*Belle Epoque*” and “*Giolitti Age*” periods. From the 1920s onwards, new technologies, such as the automobile, electric power and new products from the chemical industry, opened up an avenue for rapid economic growth. Moreover, the influx of foreign capital from the USA, the UK and, to a lesser extent, France fostered socioeconomic change in Italy and Spain. In Portugal, however, performance was mainly poor, a phenomenon that has largely been attributed to the economic policies pursued during the Republican period (1910-1926).

Finally, in the 1930s and 1940s, a combination of the Great Depression, the Spanish Civil War and WWII had a negative impact almost everywhere. France and Italy suffered huge human casualties and the large-scale destruction of capital during WWII. In the 1940s, Franco’s regime led Spain into autarky, while in Portugal the *Estado Novo* imposed a form of rigid interventionism; as a result, both economies suffered stagnation. As these country-specific stories have already been extensively documented in the literature, we propose concentrating on the regional dimension in the next few sections.

Recent developments in economic history have facilitated the study of the long-term evolution of inequality in regional income. In this study, we have collected regional population and Gross Domestic Product (GDP) for France, Italy, Portugal and Spain. Our dataset includes 84 French *départements*, 20 Italian *regioni*, 22 Portuguese historical *distritos* and 49 Spanish *provincias*. The result is a collection of population and regional GDP data for a total of 171 regions between the years 1870 and 1950,

collected on a decadal basis. To evaluate regional disparities in South-West Europe between 1870 and 1950, we have used per-capita GDP expressed in Gheary-Khamis 1990 US dollars as a measure of income. The methodology and sources used to assemble our data set can be consulted in Appendix I.

There are at least two major features of our dataset that merit further comment. Firstly, the regions studied differ in surface area and population size, as shown in Table 1. Secondly, the French *départements* predominate in our sample, accounting for almost half of the regions studied. Our study of South-West Europe therefore includes 171 regions covering a total surface area of 1,543,265 km² which would correspond to around 35% of the EU-28 surface area and approximately a third of its population.

Table 1. Descriptive statistics

Country	Number of Regions	Average surface area (km ²)	Average population (,000)		
			1870	1950	2010
France	84	6,691	439	493	715
Italy	20	15,103	1,381	2,358	3,037
Portugal	18	5,123	225	440	552
Spain	49	10,324	319	569	957

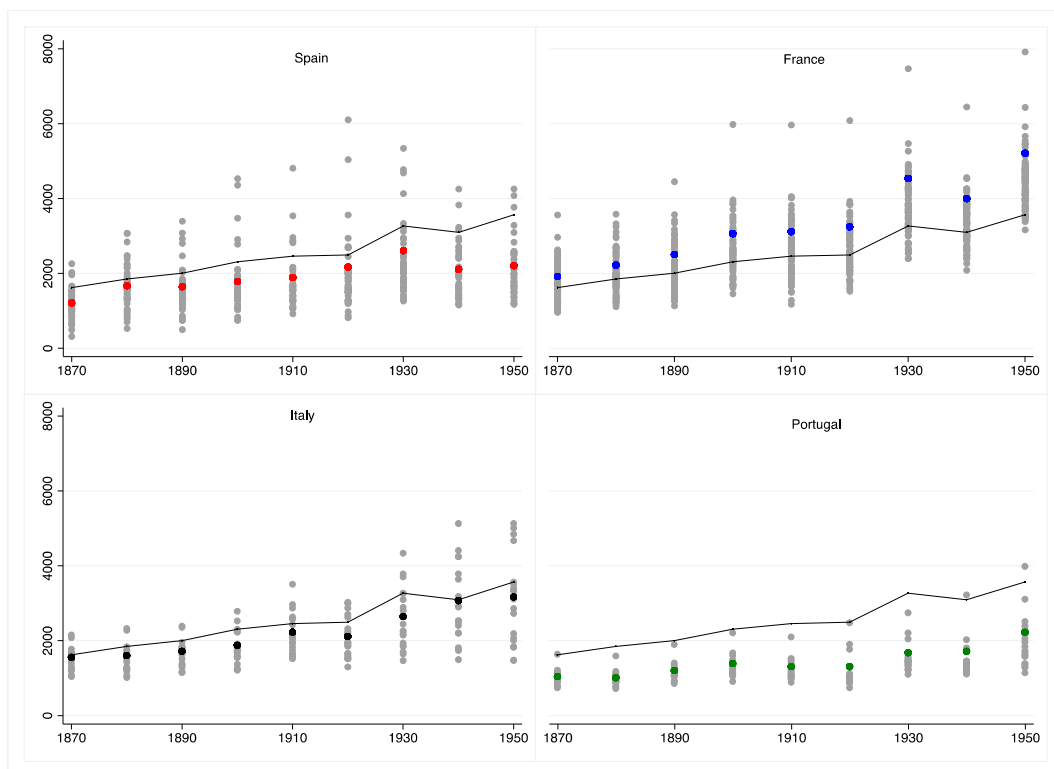
Source.- See Appendix I.

3.- From growing regional inequality to income and spatial polarization

Figure 2 shows regional per-capita income compared to the national and South-West Europe averages for 1870-1950. The coloured dotted lines denote national averages compiled on a decadal basis, while the solid lines show the average values for South-West Europe. The graphs provide a more complex picture than the one described in the previous section. Indeed, within countries economic disparities were wider. In all these

countries, regions could be found with levels of income both well above and well below the average value for South-West Europe. In France, the richest country, for example, most of the regions had values above for the South-West of Europe from the 19th century onwards. Likewise, the number of regions with above average incomes increased over time. In contrast, in the Portuguese regions, with the sole exception of Lisboa in 1940 and 1950, the values were systematically below this average. Italy and Spain present mixed results. In both cases they had a relatively small group of regions with per-capita incomes above the average for South-West Europe, while most of their regions had values below this average. Furthermore, this was a situation that did not seem to change very much over time.

Fig. 2 Regional per-capita income by country (1990 international Geary-Khamis dollars)



Notes: Each coloured dot represents the national average, whereas the solid lines show the average values for South-West Europe. Source.- See Appendix I.

Figure 2 shows another interesting result: in all four cases, the differences between the richest and poorest regions tended to increase over time, pointing to an increase in the dispersion of regional per-capita income. As previously mentioned, these findings seem to be in line with the hypothesis of an inverted U-shaped relationship between inequality in regional income and economic development of the type suggested by Jeffrey G. Williamson. He observed that regional inequality tended to increase during the early stages of modern economic growth and industrialization and then to decrease during the more mature stages of economic development. To shed further light on this subject, we make use of our dataset and study the evolution of inequality in regional income in South-West Europe as a whole. To do this, we put together the 171 regions and broadly analyse the spatial disparities between 1870 and 1950. Dispersion in regional per-capita income is measured using a single coefficient of variation (SCV) and a population-weighted coefficient of variation (WCV)⁷.

According to Figure 3, there appears to have been two major episodes. From the early stages of modern economic growth until WWI, regional disparities had a marked tendency to increase. In other words, the upward section of the Williamson's curve can be plainly identified and particularly so in the population-weighted coefficient of variation (WCV), which initially rises steeply in the graph. This indicates that the more populated regions experienced greater growth in their per-capita income. In contrast, a markedly different evolution can be observed for the period 1910-1950, with both curves following much flatter trajectories. The sharp increase in regional inequality

⁷ Robert J. Barro and Xavier Sala-i-Martin, "Convergence Across States and Regions", *Brookings Papers on Economic Activity* 1 (1991), 107-182; *idem*. "Convergence", *Journal of Political Economy* 100 (1992), 223-251.

before WWI reached a plateau in the interwar years, particularly as far as WCV is concerned. Thus, the great increase in regional inequality that took place from the late 19th century onwards came to an end in the first decades of the 20th century; from then on, regional disparities remained relatively great until around 1950⁸.

Fig. 3 Inequality in regional income in South-West Europe, 1870-1950



Source.- See Appendix I.

A more comprehensive understanding of the spatial distribution of income requires to consider it as a complex concept with different dimensions. It is important, for example, to study not only the dispersion but also the shape of the distribution and the potential

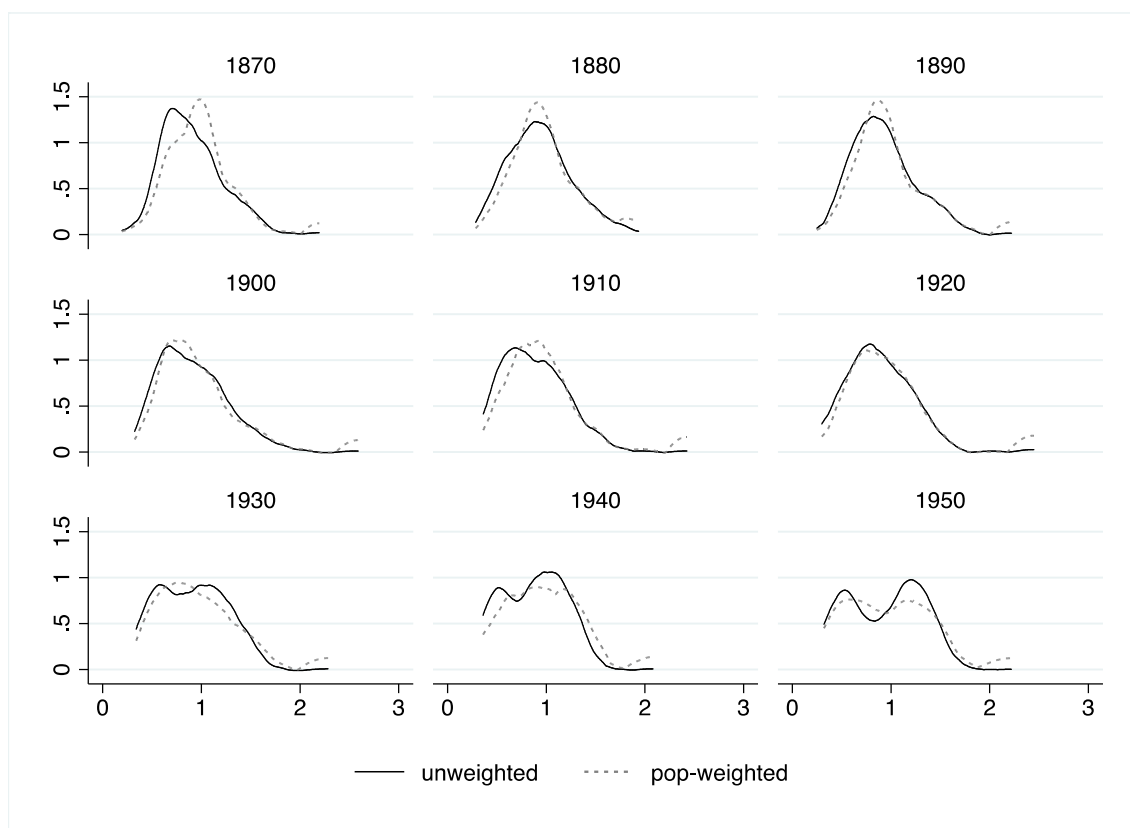
⁸ The fact that there were two world wars in the period 1910-1950, and the disruption that this caused, may well have influenced the results obtained. It would therefore be advisable to take our findings with a certain degree of caution. For instance, the observation for 1950, only five years⁸ after the end of WWII, produces a high value that clearly influences the trend of the curve. Without that observation for 1950, it could perhaps be argued that a convergence process would have begun several decades earlier and then continued throughout the Golden Age.

presence of ‘twin peaks’ or convergence clubs. With this in mind, we therefore produce kernel densities of distribution (normalised with respect to the average) for each point in time corresponding to our data set for South-West Europe. This allows us to graphically explore the modality of the distribution and its evolution decade by decade. Figure 4 shows the kernel densities for each decade, treating regions both equally and adjusting them based on population size⁹.

We first examine the evolution as depicted by single, or unweighted, kernel densities. It is interesting to observe that during the initial period of relatively low inequality (1870), a large number of regions were grouped around the average value for per-capita income in South-West Europe, which is shown by the greater height of this distribution. However, between 1870 and 1910, there appears to have been a greater concentration of regions in the tails of the distribution, and especially in the upper-tail. In particular, the upper-tail became more widely stretched as some regions forged ahead of the rest. This elongation contains the leading regions in South-West Europe: the ones that industrialised in the early stages of modern economic growth. These leading regions also achieved levels of per-capita income that were considerably higher than the average. Kernel densities therefore contribute to a better understanding of the patterns behind the increase in inequality in regional income before WWI.

⁹ Here, we follow the distribution dynamics approach. Danny Quah, “Empirical Cross-section Dynamics in Economic Growth”, *European Economic Review* 37 (1993), 426-434; Danny Quah, “Twin Peaks: Growth and Convergence in Models of Distribution Dynamics”, *Economic Journal* 106 (1996), 1045-1055; Danny Quah, “Empirics for Growth and Distribution: Stratification, Polarization, and Convergence clubs”, *Journal of Economic Growth* 2 (1997), 27-59; For the sake of simplicity, we chose the Gaussian kernel with a width that minimised the mean integrated squared error. Bernard W. Silverman, *Density Estimation for Statistics and Data Analysis* (London, 1992).

Fig. 4 Kernel densities, per-capita regional income, South-West Europe, 1870-1950



Source.- See Appendix I.

Nevertheless, from 1910 to 1950, a new pattern emerges. Figure 4 shows an evolution towards bimodality. The unimodal distribution, which is typical of the early stages of development, had turned into a bimodal distribution by the end of our study period. The result was the gradual disappearance of the upper-tail and the emergence of a bimodal structure for the distribution of regional income throughout the period 1910-1950. In other words, after an initial period of growing regional disparities in South-West Europe, these then remained steady during the interwar years. Furthermore, the polarisation of regional income became increasingly pronounced.

Kernel diagrams provide information about the distribution of income in different periods. Once we have noted the shape of the distribution, we focus on the tails. To

further investigate the main spatial patterns within South-West Europe, we present a series of regional rankings in tables 2 and 3. Beginning with the top positions in the rankings (Table 2), some appealing features stand out. First of all, it is evident that by 1870 the Paris region (Seine) already had the highest per-capita income, doubling the average for South-West Europe (223). The values for Great Britain/UK have been included as a reference. It is interesting to note that the values for the Paris region (Seine) were systematically above those for Great Britain/UK. Second, it is clear that in 1870 regions located in Northern France predominated in the top positions and that these regions had per-capita incomes ranging from 160% to 220% of the average value for South-West Europe. Third, Madrid (#15) and Liguria (#19) were, respectively, the leading regions in Spain and Italy in 1870, while Lisboa, the wealthiest Portuguese region, occupied a rather low position in the ranking (#83) with a per-capita income that was also below average for South-West Europe¹⁰.

Table 2. Regional rankings, 1870-1950 (South-West Europe average=100)

Rank	Region	1870	Rank	Region	1910	Rank	Region	1950
1	Seine (FRA)	223	1	Seine (FRA)	250	1	Seine (FRA)	222
	Great Britain/UK	200	2	Barcelona (ESP)	202		Great Britain/UK	195
2	Seine-Maritime (FRA)	185		Great Britain/UK	194	2	Haute-Saône (FRA)	181
3	Marne (FRA)	164	3	Seine-et-Marne (FRA)	170	3	Rhône (FRA)	166
4	Eure-et-Loir (FRA)	162	4	Rhône (FRA)	169	4	Nord (FRA)	159
5	Hérault (FRA)	159	5	Oise (FRA)	169	5	Seine-Maritime (FRA)	156
15	Madrid (ESP)	141	10	Guipúzcoa (ESP)	148	15	Liguria (ITA)	144
19	Liguria (ITA)	135	11	Liguria (ITA)	147	55	Guipúzcoa (ESP)	120
83	Lisboa (PRT)	88	70	Lisboa (PRT)	112	70	Lisboa (PRT)	110

Source.- See Appendix I.

¹⁰ While most of the top regions are located in northern France, there are exceptions, such as Hérault and Rhône, in the south east and east of France.

In 1910, the top positions in the ranking were still dominated by French regions and the Paris region (Seine) had increased its relative lead, reaching a peak value of 250. By this date some of the industrial regions in northern Spain had climbed into the top positions. The case of Barcelona particularly stands out: the per-capita income of this region not only doubled the average for South-West Europe but was, together with that of Paris (Seine), the only one to exceed the Great Britain/UK level. Guipúzcoa (148), in the Basque-Country, joined the top 10 in the ranking, occupying a position just above the first Italian region, Liguria. Lisboa, which was once again the wealthiest Portuguese region, moved up thirteen positions and, more importantly, its per-capita income was above the average for South-West Europe.

In 1950, the situation was quite similar to that in 1910: the French regions occupied the top positions, although there were some minor changes. The most striking fact, however, was the decline of the Spanish provinces after the Civil War (1936-39) and the period of autarky that followed, in the 1940s. Liguria and Lisboa kept their positions in relative terms. In general, our rankings reveal that Italian and Portuguese regions were seldom among the 20 most advanced regions before 1910. In the case of Italy, Liguria and Lazio were the first to arrive there (by 1910), while Lombardy, Piedmont and the Aosta Valley had also done so by 1940. Lisboa was the only Portuguese region above the average for South-West Europe average by 1910, but it was never in the top-20 at any time between 1870 and 1950. In Italy and Portugal there was therefore no region with enough industrial potential to stretch the upper tail of the distribution until 1910¹¹.

¹¹ Only three Spanish provinces remain above the South-West average: Guipúzcoa, Vizcaya and Barcelona. Interestingly, Barcelona, the second wealthiest region a few decades ago, was by 1950 in

If we now turn our attention to the bottom rankings, table 3 shows that the lower-tail of the distribution was made up of only Portuguese and Spanish regions. By 1870, the poorest regions were mostly in the North-West of the Iberian Peninsula. Portuguese regions were most present in the lowest positions in the 1910 ranking. However, by 1950 the composition had changed and although Spanish regions again occupied the bottom positions, this time the poorest regions in terms of per-capita income were located in the south of the Iberian Peninsula, Andalusia and near the Portuguese border. Thus, in the 20th century, Andalusia (Cádiz, Sevilla) lost the prominent position that it had previously held. The relative per-capita incomes of the regions at the bottom of the ranking also further declined during the period 1870-1950. In consequence, the Portuguese-Spanish border area eventually became the poorest in South-West Europe.

Table 3. Regional rankings, 1870-1950 (South-West Europe average=100)

Rank	Region	1870	Rank	Region	1910	Rank	Region	1950
140	Basilicata (ITA)	65	134	Molise (ITA)	64	98	Lozère (FRA)	89
152	Corrèze (FRA)	60	156	Lozère (FRA)	49	158	Basilicata (ITA)	41
167	Faro (PRT)	46	167	Viseu (PRT)	43	167	Almería (ESP)	36
168	Ourense (ESP)	40	168	Aveiro (PRT)	42	168	Jaén (ESP)	34
169	León (ESP)	38	169	Faro (PRT)	41	169	Cáceres (ESP)	33
170	Pontevedra (ESP)	31	170	Lugo (ESP)	39	170	Granada (ESP)	33
171	Lugo (ESP)	20	171	Castel Branco (PRT)	37	171	Guarda (PRT)	32

Source.- See Appendix I.

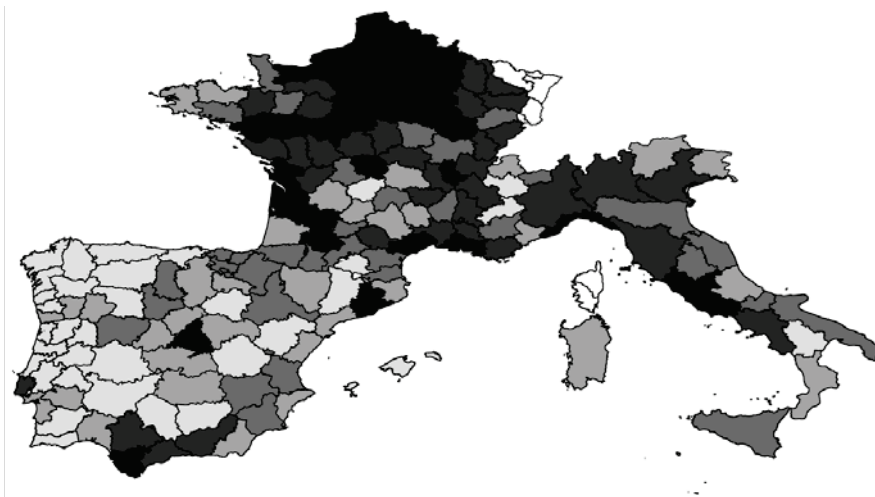
position 79 and with an income per capita below Lisboa; however, dispersion was lower in Italy and Portugal. If we take the max-min range, the maximum dispersion in France was 1.8 in 1910 and in Spain it was 2.2 in the same year, while for Italy was 1.2 in 1940 and for Portugal was 1.5 in 1930.

Finally, none of the French or Italian regions were ranked in this bottom group. On the one hand, by 1950, the French regions had moved upwards in the rankings. Of these, the lowest per-capita income corresponded to Lozère (#98). As regards Italy, by the same date, Basilicata had become the poorest region (together with Calabria) with a per-capita income that was around 40% of the average for South-West Europe. Other Southern Italian regions had average incomes ranging between 50 and 60% of the European average (in increasing order, these were Molise, Sicilia, Abruzzi, Sardegna, Puglia and Campania). Overall, the information gathered suggests that relevant changes took place in the economic geography of South-West Europe during the period corresponding to the study¹².

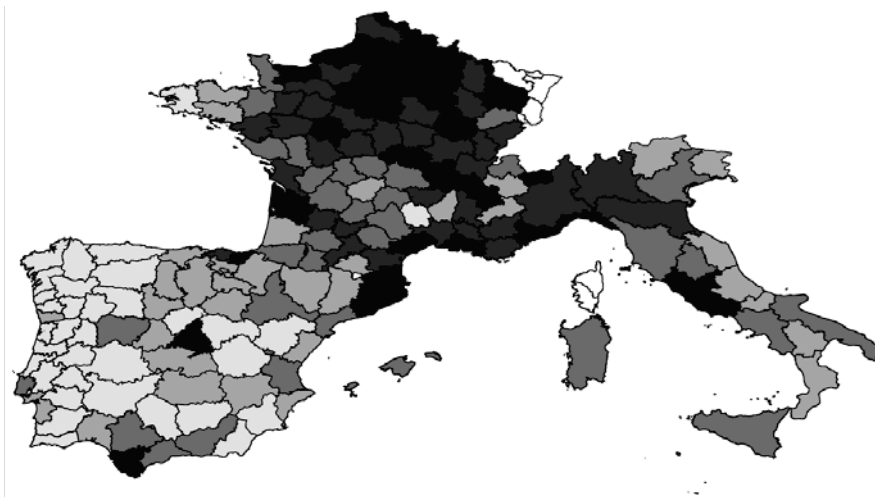
We therefore map the spatial distribution of income in South-West Europe in order to explore the main geographical patterns. Maps 1, 2, and 3 display regional per-capita income in South-West Europe. The regions are grouped in quintiles for 1870, 1910 and 1950. Black indicates “very rich” areas, while light grey reflects the “very poor” areas. By 1950, most of the southern regions of Italy and the vast majority in Spain and Portugal were at the bottom of the income distribution ranking. Furthermore, the rich regions were clustering in the north of France, around Paris (Seine), and in northern Italy. In short, it seems that a core-periphery pattern, similar to that which still prevails today, already existed in 1950.

¹² The positions of Italian regions in the ranking ranged from 122th to 139th.

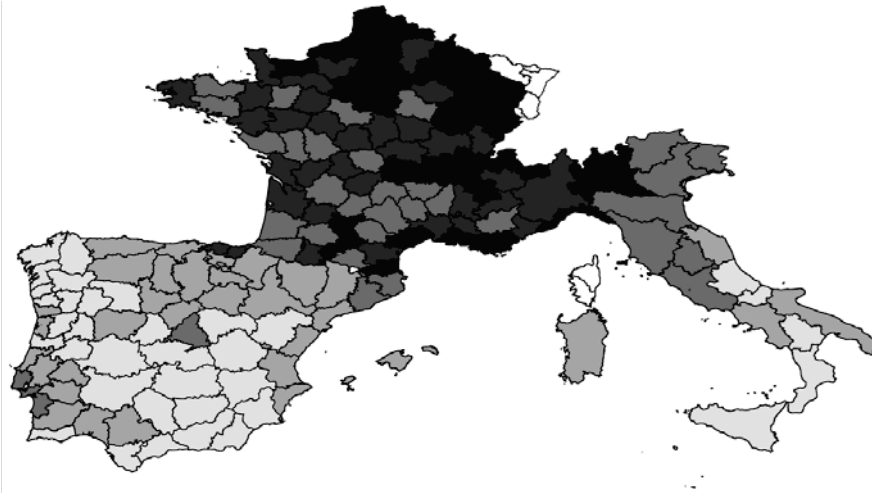
Map 1 Regional per-capita income in South-West Europe, 1870 (Quintiles)



Map 2 Regional per-capita income in South-West Europe, 1910 (Quintiles)



Map 3 Regional per-capita income in South-West Europe, 1950 (Quintiles)



Source.- See Appendix I.

4.- Industrialisation, economic growth and regional inequality.

The previous discussion led us to identify two distinct phases in the evolution of inequality in regional income within South-West Europe. The period from 1870 to 1910 was characterised by the spread of industrialization and the first wave of globalisation. Then, between 1910 and 1950 - a period which roughly corresponds to the interwar years - opportunities emerged from new energy sources, such as electric power, but within the context of a globalization backlash. During the first period, regional disparities mainly increased because a handful of regions in France and Spain stretched the upper-tail of the distribution. In the second period, however, this inequality flattened out due to the participation of more regions in modern economic growth and particularly in northern Italy (Liguria, Lombardy, Piedmont), Spain (Madrid) and Portugal (Lisboa). The fact that only a few regions industrialised in these years led, as seen in the previous section, to the creation of a ‘twin peaks’, or bimodal, distribution that clearly deserves further thought and consideration¹³.

¹³ Kevin H. O’Rourke and Jeffrey G. Williamson, *Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy* (Cambridge, 1999).

Sidney Pollard suggested that industrialisation was a unique and non-repetitive process that stood out for its marked regional character. Indeed, in the course of the 19th century industrialisation spread unevenly across South-West Europe. Some regions industrialised earlier than others under the impulse of the First Industrial Revolution, which provoked an upswing in regional income inequality. During the interwar years, and particularly in the 1920s, more regions industrialised. This time, however, the process was different and new industries (such as those associated with chemicals, automobiles and electric power) were the main locomotives of socioeconomic change. Furthermore, the greater availability of foreign capital permitted a break from the constraints imposed by reliance on domestic capital –particularly in Spain, Portugal and Italy- and paved the way for the transfer of technology¹⁴.

From the first half of the 19th century until the outbreak of WWI, South-West Europe became progressively more integrated, at both the national and international levels. The spread of paved roads, the development of coastal shipping, and the structuring of river and waterway transport systems (particularly in Northern France) promoted the further integration of national markets. Even so, rugged terrain and poor roads remained major challenges and meant that overland transport was expensive. From the 1840s onwards, the construction of railway networks aimed to improve communications. Consequently, unit transport costs fell and this encouraged intra-country and interregional trade. The implementation of liberal policies and institutional reforms also led to the removal of other internal barriers. As a result, the integration of national markets was well underway, or even near to completion, by the turn of the century.

¹⁴ Sidney Pollard, *Peaceful Conquest: The Industrialization of Europe, 1760-1970* (Oxford, 1981).

Equally, the last quarter of the 19th century witnessed a significant push towards global trade, mainly as a result of steam-powered navigation. Moreover, trading tariffs were reduced across Western Europe. However, grain invasions in the final decades of the 19th century led to a return to more protectionist policies in the mainly agrarian economies of South-West Europe, both to protect their domestic agricultural production and to foster their relatively new industrial sectors. Even so, within a context of increasing globalisation, the revitalisation of both internal and international trade helped to increase the specialisation of regional economies. This, in turn, led to the spatial concentration of their economic activity, and particularly that of manufacturing. Indeed, manufacturing industry played a leading role in these years. The question then arises as to where and why manufacturing spurred.¹⁵

As far as the factors that determine the location of manufacturing industry are concerned, there are two main strands in the literature. On the one hand, New Economic Geography models suggest that market size allows for greater economies of scale in production. When transport costs are high, manufacturing activity tends to be more dispersed across space and more oriented towards catering for the needs of local markets. However, once transport costs fall, firms have a greater incentive to concentrate their activity at specific locations and to reap the benefits of economies of agglomeration of economic activity. In contrast, as the Heckscher-Ohlin trade theorem postulates, particularly in the early stages of development, increasing regional

¹⁵ By way of an example, France raised its average tariffs (as a percentage of imports) from 5.2% in 1875 to 8.9% in 1910. During the same period, average tariffs in Italy rose from 7.9% to 11.7%. Kevin H. O'Rourke, "Tariffs and Growth in the Late Nineteenth Century", *Economic Journal* 118 (2000), 456-483. Italy raised its tariffs in 1878 and again in 1887; Portugal in 1886; Spain in 1891 and 1906.

specialization may result from differences in factor endowments, such as proximity to coal mines. Taking these arguments into account, the pattern of spatial concentration in South-West Europe between 1870 and 1950 could partly be explained by factor endowments and partly by market potential¹⁶.

The processes of industrialisation caused major disparities within individual countries and also across South-West Europe. In France, modern industry tended to concentrate in an area comprising the northern departments and the Paris basin. The supremacy of Paris (Seine) was also partly due to the high level of centralisation. The capital city was not only the seat for much of the administration and the country's main educational institutions; Paris was also the centre of France's transport network. For instance, France's railway network was organised around Paris, from where it extended densely towards the north and north-east. Some of these regions combined their comparative advantages, derived from an abundance of natural resources (including iron and hydraulic power), with their proximity to the largest market, Paris. The development of the railway was therefore a crucial factor because it reduced transport costs between the coal and iron ore fields, the traditional foundry centres, and the markets. The resulting expansion of the railway system brought with it the introduction of modern coal-based pig-iron furnaces in the northern regions¹⁷.

¹⁶ Paul Krugman, "Increasing Returns and Economic Geography", *Journal of Political Economy* 99 (1991), 483-499; Paul Krugman and Anthony J. Venables, "Globalization and the Inequality of Nations", *Quarterly Journal of Economics* 110 (1995), 857-880; Masahisa Fujita, Paul Krugman and Anthony J. Venables, *The Spatial Economy: Cities, Regions, and International Trade* (Cambridge, 1999).

¹⁷ Jean-Claude Toutain, "Les Transports en France de 1830 à 1965", *Économies et Sociétés*, Série AF 15 (1967), 49-237.

Cotton industries were also mainly located in the Nord and Alsace departments. Alsace eventually shifted from manufacturing textiles to specialising in metallurgy and chemicals and became one of the most advanced regions in Europe. In this case, the comparative advantages were based on traditional skills (know-how and artisans), water-power, and, once again, a tradition of close links with the French capital. In contrast, other traditional textile centres, such as Haute-Normandy, became less competitive and gradually lost ground. The wool industry was concentrated in northern regions of France: Champagne-Ardennes, Nord-Pas-de-Calais and Haute-Normandie. There were also important textile centres in Seine. The north-eastern region was closely followed by the south-east (Rhône and Bouches-de-Rhône) and Gironde (in the south-west). The railway connected Nord-Pas-de-Calais and Paris with the manufacturers of Lyon (Rhône) and the port of Marseille (Bouches-de-Rhône), thereby consolidating these areas as important *pôles de croissance*. Lyon extended its long tradition as a producer of silk to new industrial activities (mainly related to chemicals and metallurgical constructions). Over the years, only the *Massif Central* failed to follow the pace set by the other French regions and its average income fell behind that of South-West Europe. Previous research has already shown that the existence of economies of agglomeration largely accounts for the spatial distribution of manufacturing activity in France between 1860 and 1930¹⁸.

In Italy, productivity started to grow significantly during the period 1891-1913. Before that, at the time of Unification (1861), Italy was still a predominantly agrarian country

¹⁸ Unfortunately, due to the particular history of this region during the period studied, Alsace has had to be excluded from our sample. Pierre-Philippe Combes, Miren Lafourcade, Jacques-François Thisse and Jean-Claude Toutain, 'The Rise and Fall of Spatial Inequalities in France: A Long Run Perspective', *Explorations in Economic History* 48 (2011), 243-271.

and manufacturing was primarily artisanal and scattered across the whole territory. At that time, the domestic market was not fully integrated due to its poor transport infrastructure. Furthermore, the regional productive structures were all rather similar. In this context, interregional trade was limited, and manufacturing was highly dispersed. However, this changed with the construction of the railway system, improvements to roads, and the development of coastal shipping, all of which fostered national economic integration¹⁹.

However, in the early stages of development, the north enjoyed an advantage over the rest of the country in terms of its access to natural resources and, more particularly, to an abundance of water resources. In contrast to the drier south, its wet climate favoured intensive agriculture which allowed an increase in population density and therefore larger markets. In addition, it provided the northern manufacturing regions with cheap energy –a factor all the more relevant in a country with only limited coal reserves - and gave them a relative advantage for the production of silk. These advantages eventually spilled over to other textile-producing industries. From the late 19th century onwards,

¹⁹ Emanuele Felice and Giovanni Vecchi, “Italy’s Growth and Decline...”; Carlo Ciccarelli and Stefano Fenoaltea, “Through the Magnifying Glass: Provincial Aspects of Industrial Growth in Post-Unification Italy”, *Economic History Review* 66 (2013), 57-85; Giovanni Federico and Antonio Tena-Junguito, “The Ripples of the Industrial Revolution: Exports, Economic Growth, and Regional Integration in Italy in the Early Nineteenth Century”, *European Review of Economic History* 18 (2014), 349-369. For Italian railways, see Stefano Fenoaltea, “Railroads and Italian Industrial Growth, 1861-1913”, *Explorations in Economic History* 9 (1972), 325-351. For the integration of the domestic market, Vera Zamagni, “Ferrovie e Integrazione del Mercato Nazionale Nell’Italia Post-unitaria”, in *Studi in Onore di Gino Barbieri. Problemi e metodi di storia economica*, vol.III (Pisa, 1983), 1635-1649; and Giovanni Federico, “Market Integration and Market Efficiency: The Case of 19th Century Italy”, *Explorations in Economic History* 44 (2007), 293-316.

the Italian textile sector expanded, aided by a series of protective tariffs. The main beneficiary was the cotton industry, whose mills were concentrated in the north of the country, in the ‘*industrial triangle*’, located between Genoa, Milan and Turin. In Lombardy and Piedmont, the textile industry was also able to take advantage of the fast-flowing rivers and waterfalls of the Western Alps. In Liguria, the port of Genoa supplied coal to both the metal processing and shipbuilding industries, with a large amount of Ligurian metal production being destined for factories in Piedmont and Lombardy²⁰.

From the early 20th century onwards, engineering activities (such as the steel and mechanical industries) gained momentum, once more under the protection of tariffs. In this new period, the location of manufacturing industry did not experience many significant changes; in fact, quite to the contrary, industry and factories showed an even greater tendency to locate in the north, and particularly in the industrial triangle. During the interwar years, these modern industries took the lead and became part of the most important sectors connected with manufacturing activities. The northern regions also had natural advantages for generating electricity. This allowed them to overcome what had previously been one of the greatest obstacles to Italian industrialization: the country’s lack of coal. As a result, a clear North-South divide in both regional industrial patterns and per-capita income had become clearly established by 1950. When seeking to account for the driving forces behind industrial location, some authors have stressed

²⁰ Brian A’Hearn and Anthony J. Venables, “Regional Disparities: Internal Geography and External Trade”, in Gianni Toniolo (ed.), *The Oxford Handbook of the Italian economy since Unification*, part V (Oxford, 2013), 599-630; Stefano Fenoaltea, “Textile Production in Italy’s Regions”, *Rivista di Storia Economica* 20 (2004), 145-174; Carlo Ciccarelli and Stefano Fenoaltea, “Through the Magnifying glass...”

that natural resources (such as water power) gave the north a clear advantage in the post-Unification period. Later, from the late 19th century through to 1950, domestic market potential played a major role in explaining the concentration of manufacturing activities in the north of the country²¹.

In the case of Spain, the reduction in transport costs was a major driving force behind the integration of the home market throughout the 19th century, but this modified the map of Spanish industry in a very asymmetrical way. The most industrialised regions in the 19th century were the provinces of Barcelona, Guipúzcoa and Vizcaya, while other manufacturing centres in Andalusia and the north of Castile fell into decline. Indeed, Catalonia and the Basque Country achieved a considerable degree of industrial development, even in comparison with the rest of Europe. They particularly exhibited a high degree of specialisation in two of the sectors that had led the Industrial Revolution in Great Britain: cotton and iron. Furthermore, this occurred in spite of severe energy restrictions: water was scarce and Spain's coal reserves were small, of poor quality and difficult to extract.

²¹ Emanuele Felice, "Regional Income Inequality in Italy in the Long Run (1871-2001). Patterns and Determinants", *UHE Working Papers Universitat Autònoma de Barcelona* 2013-08 (2013); Brian A'Hearn and Anthony J. Venables, "Regional Disparities..."; The relevance of domestic market potential in explaining regional disparities in the period 1871-1911 has also been documented in Anna Missiaia, "Where Do We Go From Here? Market Access and Regional Development in Italy (1871-1911)", *European Review of Economic History* 20 (2016), 215-241; Finally, other authors, who have analysed Italian provinces instead of its regions, have added to this picture the relevance of foreign markets between 1911 and 1951, even in spite of the autarkic policies followed during the Fascist Regime. Vitorio Daniele, Paolo Malanima and Nicola Ostuni, "Geography, Market Potential and Industrialization in Italy 1871-2001", *Papers in Regional Science* (2016, early view article), DOI: 10.1111/pirs.12275.

Nonetheless, the cotton industry of Catalonia, whose tradition stretched back to the 18th century, gradually became mechanised in the 19th century. By the end of that century, this industry, and by extension that of textile manufacturing in general, had become almost exclusively concentrated in Catalonia. It was during this period that Catalonia became ‘Spain’s factory’. In the Basque Country, the iron and steel industries underwent rapid growth during the last quarter of the 19th century, exploiting their proximity to sources of iron ore, which was supplied to the factories of Vizcaya. The advantages of the non-phosphoric nature of these ores were exploited following the development of the Bessemer converter in the 1850s. Parts of the Basque Country also benefitted from their trading connections with Britain, with them exchanging iron for coal²².

²² As in the case of France, Spain’s railway network had a radial design which was centred on the capital, Madrid. The presence of abundant coastal shipping in a peninsular country like Spain partially offset the advantage that railways offered inland locations. Even so, the fall in transport costs experienced in the second half of the 19th century as a result of the introduction of railways was remarkable. Alfonso Herranz-Loncán, “La Reducción de los Costes de Transporte en España (1800-1936)”, *Cuadernos Económicos del ICE* 70 (2005), 183-203; Alfonso Herranz-Loncán, “Railroads on Backward Economies: Spain, 1850-1913”, *Journal of Economic History* 66 (2006), 853-881. For the integration of grain markets and regional price convergence, there is a classic study by Daniel Peña and Nicolás Sánchez-Albornoz, *Dependencia Dinámica entre Precios Agrícolas. El Trigo en España, 1857-1890. Un Estudio Empírico* (Madrid, 1984); Jordi Nadal, *El Fracaso de la Revolución Industrial en España, 1814-1913* (Barcelona, 1975); However, domestic production did also benefit from tariffs imposed on coal imports after 1891, although this also implied an additional cost for manufacturing activities. Spain has been well-endowed with a range of mineral resources, including copper, mercury and lead ore. However, the impact of these mining resources on its industry seems to have been rather limited. Julio Martínez-Galarraga, ‘The Determinants of Industrial Location in Spain, 1856-1929’, *Explorations in Economic History* 49 (2012), 255-275.

Factor endowments may not, however, be sufficient to explain this marked regional pattern of specialisation within Spain. Several studies have shown that in addition to factor endowments and natural resources, modern industries with increasingly high returns tended to concentrate in the regions with the largest markets. This could explain why some industries encountered problems when transport costs fell and they had to compete with cheaper and more sophisticated products imported from regions using more modern technologies. In the case of Catalonia, and more specifically Barcelona, the greater presence of artisans and capital, and the large market, combined to favour the concentration of manufacturing industry. During the interwar years, the possibility of using electricity largely mitigated traditional limitations on the availability of energy. At this time, and within the context of a more closed economy, industrialisation progressed and new locations, most of which were located in inland Spain (Madrid), experienced notable industrial progress. Even so, most of Spain's inland and southern provinces also suffered a process of de-industrialisation during the same period. The relative decline of Andalusia stands out as a particularly paradigmatic case. Similarly, the Spanish provinces nearest the Portuguese border also had lower levels of per-capita income²³.

²³ Daniel A. Tirado, Elisenda Paluzie and Jordi Pons, "Economic Integration and Industrial Location: The Case of Spain Before World War I", *Journal of Economic Geography* 2 (2002), 343-363; Joan R. Rosés, "Why Isn't the Whole of Spain Industrialized? New Economic Geography and Early Industrialization, 1797-1910", *Journal of Economic History* 63 (2003), 995-1022; Julio Martinez-Galarraga, "The Determinants of Industrial Location..."; Concepción Betrán, "Difusión y Localización Industrial en España Durante el Primer Tercio del Siglo XX", *Revista de Historia Económica* 17 (1999), 663-696; Daniel A. Tirado, Jordi Pons, Elisenda Paluzie, and Julio Martinez-Galarraga, "Trade Policy and Wage Gradients: Evidence from a Protectionist Turn", *Cliometrica* 7 (2013), 295-318.

This situation was mirrored on the other side of the border. The long-term evolution of Portugal reveals how economic activity gradually moved towards the coastal regions, while the inland regions nearest the Spanish border suffered a relative decline, in terms of both per-capita income and population. The expansion of the railway system in the late 19th century followed a two-fold strategy: connecting the two main centres of economic activity (Lisboa and Porto) and providing the inland agrarian regions with access to international markets through the ports on the coast²⁴. However, the true integration of the domestic market did not occur until the early 20th century; the same could be said of the country's industrialisation. In this case, manufacturing activities were predominantly concentrated along the coast. Porto became the country's main industrial region, specialising in textiles. However, this manufacturing was characterised by low level of productivity. Furthermore, the leading Portuguese region in terms of per-capita income, Lisboa, reinforced its position in the early decades of the 20th century and particularly during the interwar period. In contrast, the hinterland failed to industrialise, and a cluster of poor regions emerged in eastern Portugal, sharing their fate with the poor Spanish regions on the other side of the border²⁵.

²⁴ Maria Fernanda Alegria, "Análise Geográfica do Transporte de Mercadorias nos Caminhos-de-ferro Portugueses no Século XIX", *Análise Social* 24 (1988), 769-803.

²⁵ Marc Badia-Miró, Jordi Guilera and Pedro Lains, "Regional Incomes in Portugal: Industrialisation, Integration and Inequality, 1890-1980", *Revista de Historia Económica / Journal of Iberian and Latin American Economic History* 30 (2012), 225-244.; Luís Espinha da Silvera, Daniel Alves, Marco Painho, Ana Cristina Costa and Ana Alcântara, "The Evolution of Population Distribution on the Iberian Peninsula: A Transnational Approach (1877-2001)", *Historical Methods: A Journal of Quantitative and Interdisciplinary History* 46 (2013), 157-174; Daniel A. Tirado and Marc Badia-Miró, "New Evidence on Regional Inequality in Iberia (1900-2000)", *Historical Methods: A Journal of Quantitative and Interdisciplinary History* 47 (2012), 180-189.

5.- Concluding remarks

This article shows that in the case of South-West Europe the current disparities in regional per-capita income are essentially the result of a long-term evolution that can be traced back to the origins of modern economic growth. More specifically, when we look at all of the 171 South-West European regions included in our dataset, it is possible to observe that regional inequalities increased between 1870 and 1910 but subsequently tended to flatten out through until 1950. In this respect, we argue that the steady stream of incorporations to the process of modern economic growth probably determined the timing of the development of regional income inequality. Industrialisation occurred unevenly in the regions of South-West Europe, with those industrialising earliest causing the greatest disparities in regional income.

These findings allow us to distinguish two distinct stages in the emergence of these regional disparities. The first, from 1870 to 1910, coincided with the spread of industrialisation across Europe and what has been referred to as the First Globalization. The second, between 1910 and 1950, which included the interwar years, saw this process of divergence come to a halt. In the first period, regional disparities increased, with this mainly being driven by a handful of French and Spanish regions that stretched the upper-tail of income distribution. In the second period, inequality flattened out, largely driven by the incorporation of new regions on the path of modern economic growth.

Nevertheless, during this second period inequalities in regional income presented two additional characteristics that we can also identify in today's Europe. Firstly, during the period 1910-1950, the distribution of income showed an evolution towards a bimodal,

polarized pattern. While there was a stagnation in the inequality of average regional income during this period, bimodality became more pronounced. Regional per-capita income converged to two different steady states in South-West Europe, forming convergence clubs. Secondly, if we bear in mind the geographical position of the regions belonging to these two convergence clubs, we note that by 1950 most of southern Italy and the vast majority of the Spanish and Portuguese regions already occupied the bottom positions in the income distribution ranking. At the same time, the richest regions were clustering in northern France, the Paris basin and the north of Italy. This points to the emergence of the core-periphery pattern that characterizes much of South-West Europe today.

Appendix I: Sources and Methods

To evaluate regional economic disparities in South-West Europe between 1870 and 1950, we use per-capita GDP as a measure of income. In this regard, interregional comparisons face a fundamental challenge: GDP is presented in national currencies. We essentially follow Angus Maddison's approach and examine each country's GDP using a common unit: 1990 Geary-Khamis US dollars. We then use the information available on the share of GDP that each region represents in each country to compute per-capita income. Although this method allows us to make interregional comparisons, it assumes no variation in regional prices: we assume that prices did not vary across regions in the course of national development.

Data on the Gross Domestic Product (GDP) for France, Italy, Spain, and Portugal in 1990 Geary-Khamis US dollars are obtained from the Maddison project. For an updated version see Jutta Bolt and Jan Luiten van Zanden, “The Maddison Project: Collaborative Research on Historical National Accounts” *The Economic History Review* 67 (2014), 627-651. Information about regional shares of national GDP is obtained from several different works, as explained below.

FRANCE: For 1860, 1900 and 1930, the source is Pierre-Philippe Combes, Miren Lafourcade, Jacques-François Thisse, and Jean-Claude Toutain, “The Rise and Fall of Spatial Inequalities in France: A Long-run Perspective”, *Explorations in Economic History* 48 (2011), 243-271. For the years 1880-1890, we use data from Guillaume Bazot, “Interregional Inequalities, Convergence, and Growth in France from 1840 to 1911”, *Annals of Economics and Statistics* 113/114 (2014), 309-345. For 1910 and 1920, we use the estimates provided in Alfonso Díez-Minguela, Joan R. Rosés and M. Teresa Sanchis, “Paris and the French Desert Revisited: Regional Income Polarization in France, 1860-2010”, *mimeo*, (paper presented at the 56th European Regional Association Congress, August 2016). Finally, Nicole Delefortrie and Janine Morice, *Les Revenus Départementaux en 1864 et en 1954* (Paris, 1959) provide information for 1954, while that on regional GDP in 1940 is interpolated.

ITALY: Regional GDP and population data is obtained from Emanuele Felice, “Regional Value Added in Italy, 1891-2001, and the Foundation of a Long-Term Picture”, *Economic History Review*, 64 (2011), 929-950, and from Emanuele Felice and Giovanni Vecchi, “Italy’s Growth and Decline, 1891-2011”, *Journal of Interdisciplinary History* 45 (2015), 507-548.

PORTUGAL: We take the data from Marc Badia-Miró, Jordi Guilera, and Pedro Lains, “Regional Incomes in Portugal: Industrialisation, Integration and Inequality, 1890-1980”, *Revista de Historia Económica / Journal of Iberian and Latin American Economic History* 30 (2012), 225-244.

SPAIN: The data come from Daniel A. Tirado, Alfonso Diez-Minguela, and Julio Martínez-Galarraga, “Regional Inequality and Economic Development in Spain, 1860-2010”, *Journal of Historical Geography* 54 (2016), 87-98.

We also made arrangements to obtain a consistent data set on per-capita income and population compiled on a decadal basis between 1870 and 1950. For France, we work with data for 84 *départements* although France’s overseas territories, including Corsica, were excluded. Similarly, for the period between the Franco-Prussian War (1870-1871) and WWI (1914-18), we also exclude Alsace, Lorraine and a small part of the Vosges, as these territories then formed part of the German Empire. For the sake of consistency, we therefore also exclude the Alsacian *départements* (Bas-Rhin, Haut-Rhin). The territory of Belfort (included in the estimations in Haut-Rhin, Alsace) is also excluded, even though it remained in France during this period. With regard to Lorraine, the Treaty of Frankfurt (1871) established that most of the *département* of Moselle was to be German, along with parts of Meurthe. The remains of Moselle and Meurthe then formed a reduced version of the former territory of Lorraine under the name of Meurthe-et-Moselle. Here, we exclude Moselle but include Meurthe-et-Moselle. Finally, Seine and Seine-et-Oise are merged to form Paris (Seine). All in all, this leaves us with 84 French *départements*. In addition, historical estimates of French regional

GDP deserve further consideration. Firstly, it must be underlined that our dataset borrows information from diverse sources which, in turn, use different methods of estimation. Secondly, it is relevant to remember that we assume that the regional shares in 1860 were equivalent to those in 1870. We then compute our values for 1880 and 1890 based on the work by Guillaume Bazot.

For Italy, following Emanuele Felice, Bolzano is merged with Trentino-Alto Adige, leaving us with 20 *regioni*, instead of the current 21 NUTS2 regions. For Portugal, the spatial units used are the country's historical *distritos*. Furthermore, regional historical GDP estimates for 1870 and 1880 are not available. To overcome this problem, we follow Pedro Lains, "Catching-up the European Core: Portuguese Economic Growth, 1910-1990", *Explorations in Economic History* 40 (2003), 369-386, who stated that Portuguese economic growth was somewhat insignificant in the second half of the 19th century and therefore assume that the shares of regional GDP in 1870 and 1880 would have been equivalent to those of 1890, the first year with available estimates. In other words, we assume that there were no major changes in the spatial distribution of income. In the case of Spain, there are 49 *provincias*, corresponding to NUTS3 regions, with the two *provincias* in the Canary Islands merged into one.

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