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First Author: Emanuele Felice
Corr. Author: Emanuele Felice

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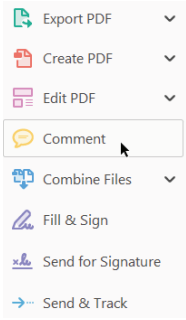

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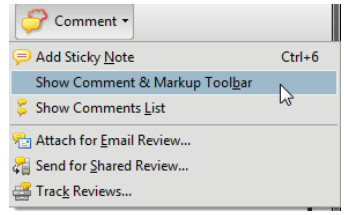

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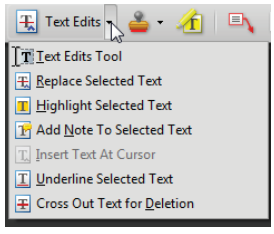

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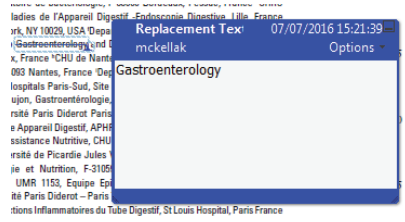

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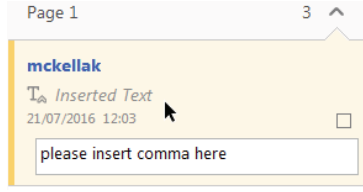

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The roots of a dual equilibrium: GDP, productivity, and structural change in the Italian regions in the long run (1871–2011)

EMANUELE FELICE
Università "G. D'Annunzio" Chieti-Pescara, Italy, emanuele.felice@gmail.com

The article presents updated estimates of GDP per capita, productivity, and employment for Italy's regions, at the NUTS II level and at current borders, for the whole economy and its three branches (agriculture, industry, services): they span 140 years in 10-year benchmarks (1871–2011). The Moran's indices of spatial autocorrelation, measures of sigma and beta convergence, Theil's and Hanna-Kim's decompositions are computed and discussed. Four phases in the history of regional inequality are identified: mild divergence (the liberal age), strong divergence (the two world wars and Fascism), general convergence (the golden age), and the "two Italies" tale (1971–2011). In the first two phases, we observe the formation of three macro-areas; in the last decades, we record convergence within the Center-North and thus an increasing North-South polarization, with differences in employment becoming more important than those in productivity. This result is in line with a socio-institutional interpretation of the North-South divide.

1. Introduction

Regional inequality is a subject of growing attention by economic historians and economists (e.g., Robinson 2013; Rosés and Wolf forthcoming). On the one side, this can be related to the revival of interest for long-run (personal) inequality, following the success of Piketty's (2014) work among scholars and the public opinion. But on the other, this is due to the fact that, in recent years, new studies have become available, allowing us to track and discuss the historical pattern of regional inequality, through a consistent methodology, for an increasing number of countries. Following the approach originally formalized by Geary and Stark (2002), with obvious variations due to the peculiarity of each country, new long-run GDP estimates have been produced for Spain (Martínez-Galarraga *et al.* 2015), Great Britain (Crafts 2005; Geary and Stark 2015), the Austrian-Hungarian empire (Schulze 2007), Sweden (Henning *et al.* 2011; Enflo and Rosés 2015), Belgium (Buyst 2010), Portugal (Badià-Miró *et al.* 2012), France (Sanchis and Rosés 2015), as well as, outside Europe, for Chile (Badià-Miró 2015) and Mexico (Aguilar-Retureta 2015).[1]

Italy is among the first countries where regional GDP estimates were produced—originally for only two benchmarks, 1938 and 1951 (Felice 2005a), then for two more years, 1891 and 1911 (Felice 2005b)—and, through time, these were increasingly refined (Brunetti *et al.* 2011; Felice 2009, 2010a, 2011, 2015a; Felice and Vasta 2015; Felice and Vecchi 2015a), in order

[1] See Felice (2016) for a critical assessment of GDP estimates at the national and regional level, for modern times, and related problems.

to incorporate advances from new research (e.g., Ciccarelli and Fenoaltea 2009, 2014); five more benchmarks—1871 and 1931 (Felice and Vecchi 2015a), 1881, 1901, 1921 (Felice 2015a)—were also added. The present article is the final outcome of this multiyear research effort. Compared to the previous works, there are five novelties or improvements. First, in order to ensure long-run consistency, all the estimates have been converted from the historical to the present (national and regional) borders. Second, I present and discuss a consistent picture of regional inequality in Italy, which for the first time runs at regular 10-year intervals throughout the time spanning from 1871 to (after linking the historical estimates to the official figures available since the 1960s) 2011: that is, from around unification until our days. Third, the coverage includes not only per capita GDP but also the corresponding estimates of productivity and employment, for what concerns both the total economy and its main sectors (agriculture, industry, and services); these figures too, thus far, were never presented with such a broad historical coverage.[2] Fourth, the estimates are discussed in light of statistics, such as Moran's indices of spatial autocorrelation, the Theil decomposition and the Hanna-Kim decomposition, never used thus for the Italian regions in historical perspective. Finally, the historical estimates are here accompanied by a thorough description of sources and methods (see the online appendix A).

As known, Italy is also one of the Western countries (maybe is the Western country) where the issue of regional imbalances has been most widely felt and deeply discussed, at the national and the international levels; and not only by economists and historians but also by philosophers, politicians, novel writers, film makers, social scientists, anthropologists, and other intellectual and public figures. Furthermore, Italy is arguably the only Western country where regional imbalances still play a major role nowadays: Italy's North-South divide in terms of GDP has no parallels in any other advanced countries of a similar size, and southern Italy is, after Eastern Europe, the biggest underdeveloped area inside the European Union.[3] Our estimates allow us to trace the roots of Italy's dual development, to identify different historical phases along this path as well as specific regional (or macro-regional) patterns. Some of the novelties of this article also bear consequences for the historical interpretation. First, they reinforce a view of the long-run evolution of regional inequality in Italy as a two-stage process, i.e., during the slow industrial takeoff the formation of three macro-areas (North-West; North-East and Center; South and islands), which became two (Center-North; South and islands) in the decades following the economic miracle; previous analyses, based on the available previous estimates, rather emphasized a simple shift from a West/East divide to the North/South one (e.g., Iuzzolino *et al.* 2013). Second, we are now able to quantify and thus properly discuss the different roles played by productivity, employment, and structural change—and along with them other issues such as the rise and decline of modern industry and of regional policies and State intervention—in determining the different regional outcomes, and how these changed over time. Not least for these reasons, our figures aim to become the essential framework upon which further improvements (concerning the role played by human and social capital, or by natural endowments or by the market size, or by enduring socio-institutional differences) are to be built.

[2] In a series of previous works (Felice 2005a, 2005b, 2010a, 2010b, 2011) regional estimates of productivity and employment were also presented, but limitedly to a few benchmarks (1891, 1911, 1938, 1951, 1971, 1981, 2001) and, again, only at historical borders.

[3] The Italian Mezzogiorno has about twice the inhabitants of Greece, with all its regions eligible for European funds, either because they are under the 75% European per capita PPP GDP threshold (the most populous regions—Campania, Sicilia, Apulia, Calabria—plus Basilicata), or because they are between 75% and 90% European per capita PPP GDP (Abruzzi, Molise, Sardinia) (Felice and Lepore, 2016, p. 21–22).

The article is organized as follows. Section 2 introduces the new regional figures of GDP per capita, productivity (GDP/employment) and employment-to-population, in 10-year intervals from 1871 to 2011; with the avail of the Williamson's indices of regional dispersion and Moran's global and local indices of spatial autocorrelation, it presents the broad picture of regional inequality in Italy. Section 3 discusses statistics of beta and sigma convergence for GDP per capita and its two components, GDP per worker and employment-to-population, and then, in order to quantify the contributions of these two components, it presents the Theil decomposition. Aiming to separate productivity from structural change, and thus to properly discuss the role of regional specialization, Section 4 examines the Hanna-Kim decomposition of differences in GDP per capita. In light of these results, Section 5 analyzes the four main periods that characterize the evolution of Italy's regional inequality, following the benchmark estimates and the Italian political and economic history: the liberal age (1871–1911), the interwar years (1911–151), the "golden" age (1951–1971), and the "silver" and "bronze" ages (1971–2011). Section 6 sums up the main results of the paper and mentions possible future lines of research. The online appendix contains a full description of sources and methods and the regional estimates of productivity and employment-to-population at the sectoral level.

2. The broad picture: from "three" to "two" Italies

Table 1 presents the estimates of per capita GDP, at present borders, for the Italian regions from 1871 to 2011 (author's estimates until 1951, official estimates from 1961 onward). From this table, we may summarize the main features of Italy's regional development as follows.

First, around the time of unification a relatively high differentiation can be observed, not in Italy but, rather, within its main macro-areas: as a whole, southern Italy was below the national average (90, Italy = 100), but its most important region, Campania, lay above it (109); the second most important southern region, Sicily, also was not far from the average (95); in a specular way, some regions of the Center-North, such as The Marches (83), Aosta Valley (80), and Trentino-Alto Adige (69), ranked below the Southern average. In other words, the three main macro-areas, the North-West, the North-East, and Center (or NEC), and the South and islands (or the *Mezzogiorno*), were not still clearly defined; neither was clearly defined the North-South divide, at least in terms of per capita GDP, although we should take into account the fact that GDP was, by that time, low throughout the country—that is, Italy as a whole still had to undertake the process of modern economic growth.[4] Of course, average per capita GDP could hide differences in industrial specialization: this was the case, actually, with 8 of the 14 provinces of the North-West scoring industrialization rates more than ten points above the national average, as opposed to 5 of 30 in the NEC (at historical borders) and only 2 of 25 in South and islands (Iuzzolino *et al.* 2011, p. 16).[5] The fact that this barely reflected on GDP figures was due to the low weight of industry, at that time, in terms of total employment, as well as to the good performance of per worker agriculture in the South (see the online appendix B for more details).

[4] For an update overview of Italy's modern economic growth and a long-run comparison with the other advanced European countries, see Felice and Vecchi (2015b).

[5] In addition, the North-West was specialized in sectors, from textiles to mechanics, bound for faster growth in the following decades, unlike the South and islands.

Q4 Table 1. *Per capita GDP of the Italian regions, 1871–2011 (Italy = 100)*

	1871	1881	1891	1901	1911	1921	1931	1938	1951	1961	1971	1981	1991	2001	2011
Piedmont	107	108	107	119	116	128	123	138	151	131	124	119	114	115	109
Aosta Valley	80	99	106	119	129	143	143	144	158	168	144	140	142	124	136
Liguria	138	142	139	148	157	142	164	167	162	125	104	101	106	109	106
Lombardy	114	115	114	123	118	124	123	138	153	145	136	130	132	130	129
Trentino-Alto A.	69	73	78	82	78	88	92	94	105	101	107	127	130	130	129
Veneto	106	89	81	84	88	78	73	83	98	97	98	109	112	113	115
Friuli-Venezia G.	125	123	122	125	128	106	117	123	111	91	95	97	104	112	113
Emilia-Romagna	96	107	106	102	109	110	109	104	112	117	114	130	122	123	122
Tuscany	106	108	103	93	98	104	106	101	105	105	108	111	105	109	109
The Marches	83	78	88	83	82	78	71	78	86	87	88	100	95	99	102
Umbria	99	103	106	100	92	93	100	95	90	93	93	101	96	96	[illegible]
Latium	134	145	137	135	133	136	140	119	107	111	110	106	114	113	[illegible]
Abruzzi	80	77	68	67	70	72	62	57	58	72	79	85	90	85	85
Molise	80	77	67	65	68	72	64	59	57	67	66	76	78	80	78
Campania	109	101	99	96	96	88	81	81	69	72	70	65	66	65	64
Apulia	89	95	104	94	87	92	85	72	65	71	71	67	68	67	68
Basilicata	67	63	75	73	74	75	70	57	46	64	73	69	67	73	71
Calabria	69	66	68	66	71	61	55	49	47	59	66	62	62	64	65
Sicily	95	92	95	89	87	72	82	72	58	61	69	72	72	66	66
Sardinia	77	81	97	91	93	91	85	82	63	75	85	75	77	77	77
North-West	114	115	114	125	122	128	129	142	154	138	129	123	124	124	121
North-East and Center	100	101	99	97	98	101	102	100	104	104	105	112	112	113	114
South and islands	90	88	90	86	85	79	77	70	61	68	71	69	70	68	68
Center-North	106	107	106	108	108	112	113	117	123	118	115	116	117	117	117
Italy (2011 euros)	*2,049*	*2,225*	*2,327*	*2,562*	*2,989*	*2,843*	*3,506*	*3,853*	*4,813*	*8,158*	*13,268*	*18,202*	*23,141*	*27,113*	*26,065*
Williamson's index of regional dispersion															
North-West	0.056	0.058	0.055	0.047	0.070	0.030	0.070	0.044	0.014	0.039	0.054	0.051	0.053	0.043	0.054
North-East and Center	0.164	0.199	0.186	0.185	0.183	0.188	0.222	0.142	0.073	0.091	0.076	0.093	0.077	0.068	0.065
South and islands	0.156	0.142	0.149	0.133	0.109	0.134	0.133	0.152	0.119	0.084	0.068	0.081	0.093	0.084	0.085
Center-North	0.139	0.162	0.154	0.178	0.173	0.180	0.210	0.207	0.206	0.162	0.129	0.100	0.095	0.080	0.080
Italy	0.169	0.188	0.173	0.204	0.200	0.234	0.263	0.302	0.366	0.290	0.241	0.247	0.244	0.250	0.245

Notes: The North-West comprises Piedmont, Aosta Valley, Liguria, Lombardy; the North-East and Center comprise Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Emilia-Romagna, Tuscany, The Marches, Umbria, Latium; Abruzzi, Molise, Campania, Apulia, Basilicata, Calabria, Sicily, and Sardinia are the regions of southern Italy; the Center-North is made of the North-West and the North-East and Center. As a measure of dispersion, the Williamson index is calculated using as weights the regional shares of population, according to the formula:

$$D = \sqrt{\sum_{i=1}^{n} \left(\frac{yi}{ym} - 1\right)^2 \cdot \frac{pi}{pm}},$$

where y is the per capita GDP (per worker GDP and employment-to-population in the next two tables), p is the population, and i and m refer to the i-region and the national (or macro-regional) total, respectively (Williamson 1965).

Sources: See the online appendix A. The national figures are from the study of Felice and Vecchi (2015a).

45 40 35 30 25 20 15 10 5

Q1

The second main result is that, after the Italian takeoff (i.e, modern economic growth) began, a remarkable divergence took place *between* the abovementioned three macro-areas; furthermore, it went along a growing convergence *within* these macro-areas. This process started in the last decades of the liberal age (1891–1911) and sped up in the interwar years. By 1951, it had reached its peak: the three macro-areas had grown clearly defined, with no overlapping among single regions. The North-South divide was at its peak too.

The third result is the convergence of the second half of the twentieth century. In turn, this can be divided into two parts: during the golden age, exceptionally (given its long-term relative performance) southern Italy converged too, and even at a higher speed than the NEC; in the following decades, however, the convergence of South and islands came to a halt, while that of the North-East and Center accelerated. As a consequence of this process, by 2011 the NEC has almost reached the North-West, and some of its regions have surpassed Piedmont and Liguria of the former industrial triangle; at the same time, all the regions of southern Italy have remained behind. If in 1951 in terms of per capita GDP Italy looked divided into three-thirds, by 2011 it looks split into two parts, with all the regions of the Center-North well above any region of the *Mezzogiorno*.

How new is this picture? Other scholars in the past have provided a long-run outline of Italy's regional inequality (1861–2001), making use of the estimates available at that time. More recently, this is the case of Iuzzolino *et al.* (2013) for the years 1861–2001, who in part used our own estimates at historical borders.[6] The main phases of Italy's regional development, as they will be discussed in Section 5, are roughly the same. For what concerns the macro-areas, however, their analysis emphasized a mere shift from a West/East divide, prevalent in the liberal age and first noticed by Fenoaltea (2003a) for industry, to the well-established North/South one, which took shape in the first half of the twentieth century. Our essential picture is different: the West/East divide by the time of Unification is significantly downsized, thanks to the use of current borders; conversely, we can now emphasize the historical creation of three macro-areas, which peaked in 1951, and the fact that the North-South divide took its current dualistic shape only after the NEC converged toward the North-West, that is, from the 1970s onward. Our argument is supported by the Williamson indices, displayed at the bottom of table 1. In 1871, regional dispersion within the NEC and within South and islands was almost as high as within Italy as a whole. From 1871 to 1951, while regional dispersion increased at the national level, and regional dispersion within the Center-North (including the North-West) remained high, both the NEC and South and islands grew internally more homogeneous. In the last decades, at the national-level regional dispersion remained high, but convergence within the macro-areas, and also within the Center-North as a whole, continued. As a consequence, by 2011 we have an entirely new situation, compared to 1871: the differences between the three macro-areas are much more important than the differences within the macro-areas; in 1871, the opposite was true.

We may further qualify this broad picture, by looking at the estimates of per worker GDP, or productivity (table 2), and workers per capita, that is, the employment-to-population ratio (table 3). They are, in a certain sense, the two factors yielding per capita

[6] Namely, for some graphs and tables they used (Brunetti *et al.* 2011), at historical borders and with less benchmarks than ours, for others they used (partly out of necessity) other estimates more tentative than ours (Daniele and Malanima 2007); in turn, these latter were based in part on now outdated estimates for industry (Fenoaltea 2003a), in part, again, on the same estimates as ours (Federico 2003; Felice 2005a, 2005b). For a critical review, see Felice (2014).

Table 2. *Per worker GDP of the Italian regions, 1871–2011 (Italy = 100)*

	1871	1881	1891	1901	1911	1921	1931	1938	1951	1961	1971	1981	1991	2001	2011
Piedmont	103	94	93	105	99	106	102	114	124	112	108	107	105	105	99
Aosta Valley	71	83	83	90	90	101	88	98	111	130	115	106	111	102	109
Liguria	134	136	135	147	152	142	157	160	165	125	105	101	105	107	104
Lombardy	109	100	102	113	111	114	110	125	137	127	119	116	113	113	115
Trentino-Alto A.	53	67	71	79	69	84	86	86	100	90	96	102	105	104	105
Veneto	115	92	83	86	88	81	78	84	97	95	96	100	99	99	98
Friuli-Venezia G.	94	106	108	115	98	145	136	112	106	86	91	89	97	101	100
Emilia-Romagna	93	107	105	99	105	104	104	95	109	110	105	110	103	103	101
Tuscany	102	109	104	94	97	105	102	98	100	99	105	101	97	98	99
The Marches	76	71	81	77	77	71	64	71	80	78	82	86	87	93	89
Umbria	90	103	106	101	91	90	98	91	89	91	95	98	95	94	89
Latium	123	139	135	136	137	140	140	121	109	118	115	113	113	109	108
Abruzzi	83	76	65	62	67	69	66	58	59	74	82	89	94	89	91
Molise	81	76	65	62	67	69	67	58	59	52	64	78	90	89	83
Campania	106	104	101	97	98	91	89	93	82	87	87	79	87	88	92
Apulia	94	106	114	103	95	102	98	84	71	78	76	80	81	82	87
Basilicata	73	64	73	68	70	69	73	57	42	61	75	77	86	90	81
Calabria	72	75	69	60	67	58	62	54	46	66	72	75	79	82	82
Sicily	104	108	114	108	106	89	98	91	73	77	84	93	94	90	91
Sardinia	94	100	119	111	113	112	95	97	71	86	97	91	86	88	86
North-West	109	102	103	114	112	115	113	126	136	123	114	111	110	110	109
North-East and Center	99	103	101	99	99	103	101	96	101	101	102	104	102	102	101
South and islands	95	97	99	93	93	87	87	82	69	78	82	84	87	87	89
Center-North	103	102	102	105	104	108	106	108	115	110	107	107	105	105	104
Italy (2011 euros)	*6,302*	*6,423*	*7,266*	*8,068*	*9,455*	*8,120*	*10,425*	*11,111*	*15,106*	*22,094*	*35,925*	*46,604*	*55,486*	*64,813*	*65,743*
Williamson's index of regional dispersion															
North-West	0.060	0.081	0.081	0.074	0.094	0.063	0.100	0.073	0.059	0.035	0.034	0.033	0.023	0.022	0.042
North-East and Center	0.172	0.180	0.171	0.175	0.176	0.223	0.233	0.150	0.082	0.119	0.091	0.079	0.072	0.049	0.054
South and islands	0.132	0.152	0.198	0.203	0.168	0.169	0.155	0.188	0.173	0.103	0.086	0.080	0.061	0.037	0.039
Center-North	0.150	0.161	0.153	0.166	0.175	0.186	0.209	0.190	0.175	0.132	0.092	0.077	0.069	0.058	0.073
Italy	0.150	0.161	0.173	0.189	0.181	0.208	0.216	0.227	0.283	0.199	0.149	0.135	0.110	0.103	0.098

Notes and Sources: See table 1.

Table 3. *Employment-to-population in the Italian regions, 1871–2011 (Italy = 100)*

	1871	1881	1891	1901	1911	1921	1931	1938	1951	1961	1971	1981	1991	2001	2011
Piedmont	104	115	115	114	117	121	121	121	119	117	114	111	108	110	110
Aosta Valley	112	120	127	132	143	142	162	146	142	129	125	131	128	121	125
Liguria	103	105	103	101	103	100	105	104	98	100	99	100	101	103	102
Lombardy	104	114	111	108	106	109	113	110	112	114	114	112	117	115	112
Trentino-Alto A.	130	110	110	104	113	104	108	109	106	112	111	124	123	124	123
Veneto	92	97	98	98	100	97	94	98	102	103	102	109	113	115	117
Friuli-Venezia G.	81	73	72	73	74	73	86	110	105	106	105	108	107	111	114
Emilia-Romagna	103	99	101	103	104	106	105	109	103	106	109	118	119	120	121
Tuscany	103	99	99	99	102	99	104	103	105	106	103	110	107	111	110
The Marches	109	110	109	109	106	111	111	110	108	112	108	117	108	107	114
Umbria	111	100	101	100	102	103	102	105	102	102	98	103	101	102	103
Latium	108	104	102	99	97	97	100	98	99	94	96	94	101	103	105
Abruzzi	96	101	104	108	104	105	94	99	98	96	97	96	96	96	93
Molise	99	101	102	104	102	104	96	102	98	128	104	98	87	90	93
Campania	102	98	98	99	99	97	91	87	84	82	80	82	76	74	70
Apulia	95	90	91	91	92	90	86	85	92	91	93	84	83	81	78
Basilicata	92	98	103	107	107	109	96	100	112	106	97	90	78	81	87
Calabria	96	89	98	111	106	106	90	91	101	90	92	83	78	78	79
Sicily	91	85	83	82	81	81	84	79	79	80	82	78	76	74	73
Sardinia	82	81	82	82	83	81	90	85	89	88	88	83	89	87	90
North-West	104	114	112	110	110	112	115	113	112	113	112	111	113	112	111
North-East and Center	102	99	99	99	100	99	101	104	103	103	103	108	110	112	113
South and islands	95	92	93	94	93	92	89	87	89	87	87	83	80	79	77
Center-North	103	105	104	103	104	104	106	107	107	107	107	109	111	112	112
Italy (%)	*45.2*	*50.3*	*49.8*	*49.7*	*47.0*	*47.2*	*39.8*	*43.4*	*42.2*	*41.9*	*37.1*	*39.1*	*41.6*	*41.7*	*39.6*
Williamson's index of regional dispersion															
North-West	0.006	0.018	0.023	0.028	0.037	0.043	0.037	0.037	0.039	0.031	0.029	0.025	0.033	0.023	0.019
North-East and Center	0.102	0.086	0.086	0.079	0.085	0.086	0.064	0.048	0.025	0.053	0.047	0.084	0.063	0.060	0.056
South and islands	0.056	0.071	0.084	0.114	0.104	0.107	0.043	0.075	0.098	0.097	0.075	0.056	0.072	0.079	0.096
Center-North	0.078	0.095	0.090	0.083	0.088	0.099	0.090	0.069	0.062	0.068	0.063	0.069	0.061	0.051	0.049
Italy	0.081	0.109	0.105	0.104	0.107	0.117	0.117	0.122	0.115	0.125	0.116	0.142	0.161	0.170	0.177

Notes and Sources: See table 1. Estimates are based on the present population.

GDP: following the equation GDP/P = GDP/L * L/P (where *L* is the employment and *P* is the population), imbalances in per capita GDP turn out to be the product of the imbalances in these two underlying determinants.[7] For what concerns the North-South divide, first of all it should be noticed that in both productivity and employment-to-population regional differences are relatively milder than in the case of per capita GDP: southern Italy displays both lower productivity and lower employment-to-population than the average, throughout the history of post-unification Italy, and as a consequence it has an even lower per capita GDP.[8] In terms of regional dispersion, as measured by Williamson's indices, we observe something different: in productivity, we have a process of decreasing dispersion also at the national level, although milder than the one within the macro-areas (this is, even stronger than in per capita GDP); in employment-to-population, while differences within the macro-areas remain relatively low, we observe a process of increasing differences between the macro-areas, but much milder than in per capita GDP and mostly confined to the last decades.

The different patterns of polarization between GDP and its components are confirmed by formal tests of spatial autocorrelation. Moran's global index of spatial correlation (table 4) clearly indicates a growing spatial correlation of per capita GDP: absent in the first decades following Unification, it became noticeable with the turn of the century, when the industrial triangle began to take shape; then it grew remarkably in the first half of the twentieth century, decreased very slowly during the economic miracle, thanks to the convergence of South and islands, but after that it remained stable or even increased again. However, with respect to per capita GDP spatial correlation in per worker GDP started later on, at the end of the inter-war period, and remained lower. Spatial autocorrelation in employment-to-population started instead much earlier, in the second half of the nineteenth century, but it too remained lower than the one in per capita GDP, for most of the period; it remarkably grew only from the 1970s onward, so much so that in the last three benchmarks it turns out to be as important as spatial autocorrelation in per capita GDP.

We may further qualify these results by looking at Moran's local index of spatial autocorrelation, for selected benchmarks (table 5). During the liberal age, we observe an increasing local autocorrelation for the North-West in per capita GDP (*Y*), but with little support in either productivity (*P*) or employment-to-population (EP)—rather, it is the product of the two. Conversely, the growth of spatial autocorrelation is remarkable in the interwar years, for the North-West as well as for South and islands, and at that time it is mirrored also by the other two variables. After the economic miracle (when things remained more or less unchanged), from 1971 to 2011 we observe a spread of spatial autocorrelation to the NEC regions (and to the North-Eastern ones above all), thus resulting into a shift from "three" to "two" Italies. Although this is mostly supported by differences in employment-to-population, it is worth noticing that, in this respect, autocorrelation in productivity and

[7] For an early application to the Italian North-South divide, see Daniele and Malanima (2007).

[8] It may be worth adding that, during the liberal age, the relatively good performance in productivity of southern Italy—and in particular of regions such as Apulia, Sicily, Sardinia—is due to high GDP figures for agriculture (see tables B.4 and B.7 in the online appendix B), as resulting from Federico's estimates for 1891 and 1911 (Federico 2003; but see also Federico 2007, for a critical discussion of these results) and from our own estimates following Federico for 1871, 1881, 1901 (see table A.4 in the online appendix A): it is a lead in per worker terms, however; in per hectare terms, the southern agriculture was significantly less productive (see Felice 2007, p. 133). We know that a remarkable improvement in southern agriculture took place in the years following unification, thanks to the free-trade policies of the new Italian state (Ciccarelli and Fenoaltea 2012; Felice 2013, pp. 38–40 and 81–82).

Table 4. *Moran's global I index of spatial autocorrelation for the Italian regions, 1871–2011*

Per capita GDP															
Moran's global I	0.002	0.050	0.036	0.156	0.171	0.288	0.261	0.405	0.526	0.480	0.493	0.510	0.485	0.520	0.489
z	0.723	1.364	1.172	2.764	2.991	4.479	4.158	6.063	7.610	7.147	7.225	7.358	7.046	7.452	7.063
p-Value, one-tailed	*0.235*	*0.081*	*0.121*	*0.003*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Per worker GDP															
Moran's global I	−0.075	−0.062	−0.057	0.025	0.025	0.044	0.008	0.217	0.426	0.397	0.400	0.418	0.347	0.396	0.335
z	−0.296	−0.128	−0.062	1.040	1.055	1.281	0.819	3.667	6.443	5.928	5.956	6.162	5.249	5.891	5.364
p-Value, one-tailed	*0.384*	*0.449*	*0.475*	*0.149*	*0.146*	*0.100*	*0.209*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Employment-to-population															
Moran's global I	0.036	0.170	0.130	0.073	0.128	0.118	0.254	0.274	0.187	0.109	0.317	0.396	0.497	0.524	0.466
z	1.227	2.989	2.498	1.729	2.576	2.385	4.806	4.637	3.431	2.147	4.953	5.900	7.208	7.533	6.805
p-Value, one-tailed	*0.110*	*0.001*	*0.006*	*0.042*	*0.005*	*0.009*	*0.000*	*0.000*	*0.000*	*0.016*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*

Sources and Notes: Elaborations from tables 1–3. Here as in the next table, in order to construct the binary spatial weights matrix the latitudes and longitudes of the regional capitals have been used; the expected value under the null hypothesis of no global spatial autocorrelation is −0.053, the standard deviation of the index is 0.077.

Q7

Table 5. *Moran's local I index of spatial autocorrelation for the Italian regions, 1871–2011*

	1871			1911			1951			1971			2011		
	Y	*P*	EP	*Y*	*P*	EP	*Y*	*P*	EP	*Y*	*P*	EP	*Y*	*P*	EP
Piedmont	0.46	0.15	0.76	2.68**	0.34	4.65***	7.29***	4.30***	5.40***	6.13***	3.83***	4.99***	2.09*	1.65	1.84*
Aosta Valley	1.47	−1.94*	1.57	3.05***	−0.37	5.41***	6.64***	2.39	5.97***	7.03***	4.14***	5.82***	3.70***	3.55***	2.65**
Liguria	1.65*	0.55	0.54	3.57***	0.98	0.19	6.43***	6.92***	−1.15	1.72**	2.83***	−0.64	1.37*	3.20***	0.21
Lombardy	1.78**	0.99	0.74	2.69***	1.55*	0.65	6.38***	6.06***	1.68**	5.85***	4.97***	3.36***	4.48***	5.86***	2.16**
Trentino-Alto A.	−2.99***	−4.06***	0.38	−1.70*	−1.50	0.39	0.71	0.75	0.37	1.42**	0.43	2.03**	4.11***	2.51***	4.07***
Veneto	0.51	−0.85	−1.61	−0.41	−0.01	0.05	0.13	0.35	0.04	0.23	0.22	0.24	2.19**	0.53	3.11***
Friuli-Venezia G.	−0.06	−0.01	−2.5**	−1.29	−0.13	−0.80	0.05	0.11	0.03	0.00	−0.07	0.43	1.13*	0.32	1.69**
Emilia-Romagna	−0.01	−0.02	0.49	0.31	0.05	0.11	1.06	1.38	0.04	2.08**	1.80*	1.73*	3.54***	1.47	4.31***
Tuscany	0.72	0.26	0.48	−0.04	0.09	−0.01	0.58	0.69	0.14	1.34	1.65*	0.44	1.60*	0.84	1.90*
The Marches	−0.73	−0.51	0.20	0.30	0.35	−0.26	0.14	0.06	−0.32	0.12	0.09	−0.20	0.08	−0.10	0.52
Umbria	0.17	−0.13	0.80	0.04	0.01	0.00	0.02	−0.02	0.02	−0.02	0.03	−0.13	−0.33	−0.68	0.20
Latium	−1.33	−0.98	−0.01	−3.04***	−3.1***	0.31	−0.57	−0.84	0.41	−1.11	−2.32**	0.45	−0.74	2.18**	−0.13
Abruzzi	−0.90	−0.28	−0.57	0.57	−0.22	−0.14	1.34*	0.89	0.46	1.01	0.80	0.38	0.31	0.48	0.04
Molise	0.30	0.10	0.13	2.25**	1.47*	0.01	2.93***	2.81***	0.62	3.37***	3.96***	−0.79	2.15**	2.75***	1.19*
Campania	−1.09	−0.78	−0.09	0.30	−0.28	0.13	2.25**	1.04	1.58**	3.25***	1.38*	2.84***	3.93***	1.08	4.27***
Apulia	0.64	−0.04	0.36	1.14*	−0.01	−0.03	2.36***	2.11**	0.50	2.88***	3.29***	1.24*	3.47***	2.55***	3.32***
Basilicata	1.45*	0.52	0.38	2.43**	1.57*	−0.36	4.15***	4.64***	−1.84*	3.47***	4.27***	0.96	4.12***	4.36***	3.08***
Calabria	1.44**	0.53	0.44	1.85***	1.29**	−0.18	2.78***	3.10***	0.17	2.88***	3.18***	1.41**	3.40***	2.78***	3.27***
Sicily	0.04	−0.15	0.71	0.54	−0.30	0.67*	1.86***	1.09**	2.06	2.03***	0.92**	2.96***	2.67***	0.73*	3.41***
Sardinia	−0.39	0.01	0.08	−0.05	0.46*	0.60**	0.13	0.00	0.52**	0.05	0.04	0.60**	0.14	−0.20	0.22

Sources and Notes: See tabl

45 40 35 30 25 20 15 10 5

autocorrelation in employment-to-population are both present, and both reinforce the autocorrelation in per capita GDP.

3. Opposite trends, shifts in contributions: productivity and employment

Figure 1, displaying beta convergence (on the left) and sigma convergence (on the right) for the three variables over the long run, visually exemplifies the different trends between per capita GDP and its two components. From 1871 to 2011, beta convergence, i.e., the negative slope of the line in the left, is remarkably stronger in productivity (as much higher is the value of R^2: 0.797 versus 0.247 of per capita GDP), while virtually absent in employment-to-population: partly this is the result of the fact that productivity reflects not only capital deepening, as implied by the standard Solow model but also structural change (Paci and Pigliaru 1997), as we will see in the next section; on the negative side, some blockades in structural change also affect employment-to-population, resulting in lower employment rate (if the abandonment of the agricultural sector is not compensated by the growth of industry and services). Concerning these opposite trends, sigma convergence is at least equally eloquent. The inverted-U shape of the curve is noticeable in the case of productivity, only mild in per capita GDP. For employment-to-population, instead, the graph of sigma convergence has an opposite orientation (U-shaped), that is, in this case, we have indeed an increase in dispersion over the long run and, above all, in the second half of the twentieth century: the contrast with productivity could hardly be stronger.

Besides these opposite trends, the figure also gives more information about the regional paths in the long run (beta convergence) and in the different periods (sigma convergence). Concerning the former, we may see as Campania, the most important southern region is the worst performer in both per capita GDP and employment-to-population, while in productivity it lies on the average (that is, on the reference line). To a minor degree, this difference holds true also for the next two most important southern regions, Sicily and Apulia; however, it is less strong in the three other regions of mainland South, demographically less important; and the second southern island, Sardinia, is actually a winner in employment-to-population. Within the Center-North, the situation is less clear: the two best-performing regions in per capita GDP are Trentino-Alto Adige and Aosta Valley, both also the best-performing regions in productivity; then comes third Friuli-Venezia Giulia, that instead owes success to its high employment-to-population; Emilia-Romagna and Veneto also owe their good performance mostly to their employment-to-population; not least, the most important Italian region and a remarkable success story, Lombardy, is significantly above the average in both productivity and employment-to-population.

Thus productivity and employment-to-population follow different trends. We may quantify their different contributions to regional inequality, by computing a Theil decomposition of per capita GDP (table 6).[9] The results show, first of all, that until 1951 the rise of regional inequality is entirely due to productivity. It is worth adding that the employment-to-population ratio can be seen, in turn, as the product between the employment rate (the employment divided by the working age population, 15–64 years old) and the activity rate (the working age population divided by total population). Although only at historical borders, recently long-run regional estimates of these two components have been produced (Cappelli *et al.* 2018): in the first half of the twentieth century, fertility rates declined more rapidly in the Center-North than in South and islands (also as a result of the expansionist demographic

[9] See Enflo and Rosés (2015, p. 203) for an application to the Swedish regions.

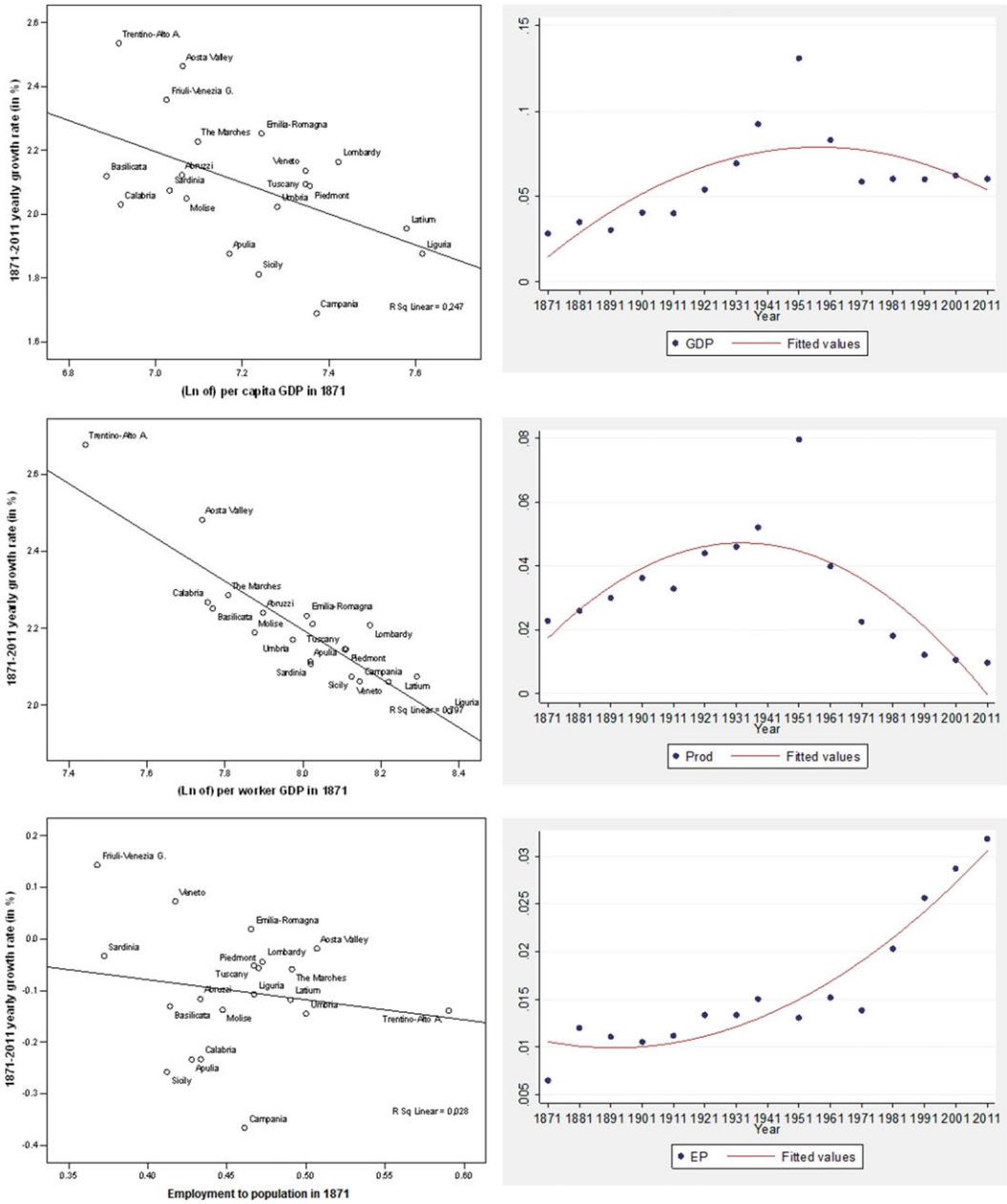

Figure 1. *Beta and sigma convergence in per capita GDP, per worker GDP, and employment-to-population, 1871–2011*

Notes and Sources: *Elaborations from tables 1–3; for beta convergence, standardized beta is −0.497 for per capita GDP, −0.893 for per worker GDP, −0.166 for workers per capita; sigma convergence is the standard deviation (for population-weighted indices of regional dispersion, see tables 1–3).*

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Table 6. *Theil decomposition of GDP per capita, 1871–2011*

	1871	1881	1891	1901	1911	1921	1931	1938	1951	1961	1971	1981	1991	2001	2011
Theil GDP pc of which	0.016	0.019	0.018	0.020	0.019	0.027	0.033	0.049	0.068	0.044	0.031	0.033	0.035	0.034	0.033
GDP per worker	*0.012*	*0.011*	*0.011*	*0.014*	*0.014*	*0.020*	*0.027*	*0.041*	*0.062*	*0.036*	*0.024*	*0.022*	*0.019*	*0.019*	*0.016*
Empl./Pop.	*0.004*	*0.007*	*0.007*	*0.006*	*0.006*	*0.007*	*0.006*	*0.008*	*0.006*	*0.008*	*0.007*	*0.011*	*0.015*	*0.015*	*0.017*

Note: The Theil index of GDP per capita (x) inequality is decomposed into a population-weighted sum of the inequality indices due to productivity per worker (Y/L) and to employment-to-population (L/P). Algebraically:

$$T\,(x,\ p)\ =\ \sum_{i}^{n} p_i \log\left(\frac{\mu}{x^i}\right)\ =\ \sum_{i}^{n} p_i \left\{\log\left(\frac{Y/L}{Y_i/L_i}\right) + \log\left(\frac{L/P}{L_i/P_i}\right)\right\}$$

where p_i denotes the share of region i in the Italian population, and μ is the Italian average GDP per capita.
Sources: Elaborations from tables 1–3.

policies of the fascist regime, which impacted mainly on South and islands), which led to rising inequalities in activity rates; at the same time, and even though there was no sign of any industrial awakening of the *Mezzogiorno*, international emigration was no longer possible, which resulted in higher unemployment. Until now, we did not know to which extent the expansionist demographic policies of the interwar years had contributed to the enlargement of the North-South divide in per capita GDP. Our figures and the Theil decomposition suggest that this impact, present nonetheless, was only marginal; the real problem was the lack of reforms in the agrarian sector and the related absence of industrial takeoff, which also were a consequence of the fascist regime (for more on this see Section 5.2, but we may anticipate that the extensive southern latifundia remained untouched in those years, because the regime rested on the support of the southern big landowners (e.g., Felice 2013)).

From 1951 onward, as mentioned the two factors follow opposite trends: in productivity, southern Italy converged, mostly during the golden age, but also, although at a slower rate, in the last 40 years; conversely, in employment-to-population the North-South divide did increase, and it did so precisely in the last 40 years. In other words, the falling behind of southern Italy observed from 1971 to 2011 is due entirely to the increasing gap in employment-to-population, and particularly in employment rate (while in activity rates there was some convergence (Cappelli *et al.* 2018)). Regional inequality in productivity is decreasing, much more rapidly during the economic miracle. However, it is worth noticing that it is still present nowadays: the Theil decomposition shows that in 2011 it is almost as important as the employment-to-population ratio (but in 1971 it was between three and four times more important).

Another difference worth being emphasized is that, within the Center-North, during the last decade the NEC fully reaches the North-West and even overcomes it in employment-to-population, while remaining below in per worker productivity: this is a consequence of the specialization of the regions of the "third Italy" (mostly in the Center and the North-East) in lighter manufactures (intensive in labor and with lower per worker value added). This process, too, is a novelty of the last decades: from the end of the nineteenth century throughout the golden age, the gap in employment-to-population between the North-West and the NEC was significantly in favor of the former.

4. Structural change and regional specialization

For the observed differences in per capita and per worker GDP, structural change (the different timing, at the regional level, of the shift from agriculture to industry and services) and regional sectoral specialization play a crucial role; above all, because per worker GDP is lower in agriculture than in industry and services.[10]

A first, simple way of looking at structural change and regional specialization is by way of location quotients (LQs).[11] For GDP and employment, table 7 reports the LQs[12] of the Italian macro-regions (for the underlying data, at the regional level, reference can be made

[10] See the statistical appendix for more data as well as, at the national level (Broadberry *et al.* 2013). The productivity figures (output per worker) produced by Broadberry, Giordano, and Zollino, at the national level, are based on the same GDP as ours and on either the headcount method or the full-time equivalent (FTE) workers; in broad terms, the former method yields a picture very similar to ours (not surprisingly), the FTE one results in slower productivity growth in the interwar years.

[11] See Rosés *et al.* (2010, p. 252) for an application to the Spanish regions.

[12] An LQ is a sectoral share of a regional total, divided by the sectoral share of the national total, for some economic statistic (GDP and workers, in our case). For example, an LQ higher than 1 means that the region (or macro-region) has a higher concentration, in that sector, than the nation.

to the online appendix B). As can be seen, the industrial specialization of the North-West peaks in 1951 (the LQ of industrial workers reached 1.56), which is precisely the year when also the advantage in per capita GDP for this area is the biggest; conversely, at that time in southern Italy the share of agricultural labor force remained around 60 percent of the total. After 1951, also southern Italy began to industrialize, but as we know this had only a limited impact on average GDP: in fact, southern Italy maintained an industrial LQ significantly lower than the Italian average, while its agricultural LQ was much higher.

We may take a further analytical step and quantify the distinct contributions of productivity and sectoral specialization to the differences in GDP per capita. To this scope, we employ the procedure introduced by Hanna (1951) and later on used by Kim (1998), which separates the differences in per capita GDP into those due to industry mix and those due to sectoral productivity (table 8).[13] From 1871 to 1911, the rise of the North-West is mostly due to differences in sectoral productivity; this confirms the view of a slow takeoff of this area, with a limited role for structural change during the liberal age. Conversely, from 1911 to 1951, when regional inequality greatly increased, the differences in the industry mix became much more important: it can be seen as the ultimate confirmation of the fact that the falling back of southern Italy was due, first of all, to the lack of industrial development. Industrialization in the South did occur in the following phase, during the economic miracle, but it was not enough to change the situation: in 1971, differences in the industry mix still are considerably more important than those in sectoral productivity (which are decreasing). In the South, differences in productivity continued to decline from 1971 to 2011, while those in the industry mix increased. Within the Center-North, it is worth noticing that, in 2011, Lombardy is the only important region which has a significant advantage in both industry mix and sectoral productivity. Piedmont, Veneto, Friuli-Venezia Giulia, Emilia-Romagna, and Tuscany have instead a significant advantage in the former, but a disadvantage in the latter (or a much minor advantage in the case of Emilia-Romagna).

5. For a regional economic history of Italy: GDP and productivity by subperiods

The liberal age (1871–1911)

During the liberal age (1871–1911), in spite of the (slow) takeoff of the industrial triangle in the North-West, we may observe a slow process of beta convergence, in both income and productivity (figure 2). Some outliers, like the small and mountainous Aosta Valley and Trentino-Alto Adige (at that time, a part of Austria) contribute to this result: they are

[13] The procedure, in Sukkoo Kim's words, involves constructing two counterfactual regional income estimates to separate income differences due to industry mix and wage effects. One hypothetical income is based on the assumption that all regions have identical industrial mixes and identical wages in each of the industries. In this instance, all regional incomes per capita would be identical to the overall national average. The second hypothetical income per capita is based on the assumption that regions have different industrial structures but identical incomes per capita at the industry level. The industry income per capita for all regions is set equal to the national industry income per capita. The two hypothetical incomes per capita and the actual income per capita are then used to estimate industry mix and wage effects. The difference between the two hypothetical incomes–industry mix income and the overall national average provides a measure of the income differences due to the divergence in regional industrial structures. The difference between the actual income per capita and the hypothetical industry mix income provides a measure of the income differences due to divergence in wages» (Kim 1998, pp. 670–671). See also Martínez-Galarraga *et al.* (2015) for an application to Spain.

Table 7. *LQs of GDP and employment in the Italian macro-regions, 1871–2011*

	1871	1881	1891	1901	1911	1921	1931	1938	1951	1961	1971	1981	1991	2001	2011
Agriculture, GDP															
North-West	0.68	0.67	0.68	0.66	0.69	0.73	0.61	0.60	0.60	0.55	0.51	0.51	0.57	0.65	0.61
North-East and Center	1.06	0.99	1.03	1.08	1.07	1.06	1.00	1.10	1.07	1.06	0.94	0.98	0.89	0.92	0.91
South and islands	1.22	1.32	1.28	1.26	1.24	1.23	1.51	1.41	1.54	1.55	1.80	1.67	1.76	1.65	1.70
Italy (%)	*47.3*	*46.5*	*43.2*	*43.4*	*38.7*	*40.8*	*22.6*	*29.8*	*27.0*	*16.6*	*8.4*	*5.7*	*3.7*	*2.6*	*2.3*
Agriculture, workers															
North-West	1.03	0.97	0.94	0.91	0.85	0.79	0.71	0.69	0.62	0.58	0.49	0.52	0.56	0.54	0.63
North-East and Center	1.01	1.01	1.03	1.04	1.03	1.05	1.08	1.08	1.00	0.96	0.85	0.91	0.86	0.82	0.80
South & islands	0.96	1.01	1.02	1.03	1.10	1.13	1.18	1.18	1.33	1.44	1.74	1.61	1.68	1.80	1.73
Italy (%)	*59.8*	*59.5*	*59.3*	*59.3*	*55.1*	*55.7*	*48.4*	*48.0*	*44.5*	*30.5*	*18.6*	*12.7*	*8.4*	*5.6*	*5.1*
Industry, GDP															
North-West	1.60	1.39	1.40	1.43	1.31	1.30	1.27	1.41	1.40	1.37	1.29	1.21	1.18	1.18	1.17
North-East and Center	0.86	0.95	0.95	0.91	0.95	0.91	0.92	0.87	0.87	0.87	0.89	0.98	0.99	1.02	1.02
South and islands	0.62	0.69	0.68	0.66	0.73	0.78	0.76	0.62	0.55	0.67	0.75	0.76	0.77	0.73	0.72
Italy (%)	*25.0*	*26.2*	*29.6*	*26.4*	*28.4*	*26.6*	*36.9*	*32.1*	*34.8*	*36.8*	*37.3*	*36.4*	*30.5*	*27.5*	*24.6*
Industry, workers															
North-West	1.17	1.13	1.16	1.20	1.30	1.38	1.44	1.46	1.56	1.39	1.35	1.24	1.23	1.18	1.14
North-East and Center	0.98	0.95	0.92	0.90	0.94	0.89	0.86	0.86	0.93	0.95	0.96	0.98	1.02	1.04	1.05
South and islands	0.89	0.94	0.94	0.94	0.81	0.80	0.77	0.75	0.61	0.69	0.69	0.78	0.73	0.75	0.77
Italy (%)	*19.8*	*21.9*	*22.5*	*22.8*	*25.4*	*23.7*	*27.3*	*27.7*	*26.8*	*33.9*	*38.1*	*35.7*	*30.5*	*28.8*	*26.1*
Services, GDP															
North-West	1.00	1.19	1.08	1.11	1.09	1.09	0.97	0.97	0.91	0.86	0.88	0.92	0.94	0.94	0.95
North-East and Center	1.03	1.07	1.02	0.97	0.95	1.00	1.07	1.03	1.07	1.08	1.08	1.02	1.01	1.00	1.00
South and islands	0.96	0.74	0.90	0.92	0.95	0.89	0.93	1.00	1.03	1.06	1.05	1.08	1.07	1.08	1.07
Italy (%)	*27.7*	*27.3*	*27.2*	*30.2*	*32.9*	*32.6*	*40.6*	*38.1*	*38.2*	*46.7*	*54.3*	*57.9*	*65.8*	*69.8*	*73.1*
Services, workers															
North-West	0.75	0.92	0.98	1.05	1.03	1.13	1.09	1.09	1.07	0.98	0.91	0.95	0.95	0.96	0.98
North-East and Center	0.99	1.03	1.01	0.99	1.00	1.00	1.00	0.99	1.07	1.08	1.10	1.03	1.01	1.00	1.00
South and islands	1.22	1.03	1.00	0.97	0.97	0.89	0.91	0.93	0.86	0.91	0.96	1.00	1.04	1.04	1.03
Italy (%)	*20.4*	*18.6*	*18.3*	*17.9*	*19.5*	*20.6*	*24.3*	*24.3*	*28.6*	*35.7*	*43.2*	*51.6*	*61.0*	*65.5*	*68.8*

Notes: An LQ is a sectoral share of a regional total, divided by the sectoral share of the national total, for some economic statistic (GDP and workers, in our case); an LQ higher than 1 means that the region (or macro-region) has a higher concentration than the nation, in that sector.
Sources: Elaborations from the online appendix B.

Table 8. *Hanna-Kim decomposition of differences in per capita GDP*

	1871		1911		1951		1971		[illegible]	
	Industry mix	Sectoral product	Industry mix	Sectoral product	Industry mix	Sectoral product	Industry mix	Sectoral product	Industry mix	Sectoral product
Piedmont	3.5	3.5	5.8	10.2	48.4	2.6	17.7	6.3	9.3	−0.3
Aosta Valley	−11.6	−8.4	6.4	22.6	38.3	19.7	30.0	14.0	27.8	8.2
Liguria	12.9	25.1	6.5	50.5	48.8	13.2	−7.2	11.2	4.2	1.8
Lombardy	6.4	7.6	7.0	11.0	46.1	6.9	25.2	10.8	18.7	10.3
Trentino-Alto A.	−13.5	−17.5	−9.9	−12.1	2.4	2.6	−4.6	11.6	23.0	6.0
Veneto	3.4	2.6	−6.2	−5.8	−1.0	−1.0	−0.7	−1.3	15.5	−0.5
Friuli-Venezia G.	28.6	−3.6	35.8	−7.8	4.2	6.8	−1.4	−3.6	13.9	−0.9
Emilia-Romagna	−1.9	−2.1	4.4	4.6	5.9	6.1	10.6	3.4	19.9	2.1
Tuscany	2.7	3.3	−1.0	−1.0	2.1	2.9	7.1	0.9	10.4	−1.4
The Marches	−8.2	−8.8	−9.4	−8.6	−7.1	−6.9	−5.6	−6.4	−0.6	2.6
Umbria	−0.5	−0.5	−4.5	−3.5	−5.6	−4.4	−5.2	−1.8	−3.2	−4.8
Latium	11.6	22.4	13.8	19.2	2.9	4.1	7.2	2.8	9.2	3.8
Abruzzi	−12.0	−8.0	−16.8	−13.2	−25.3	−16.7	−14.3	−6.7	−10.8	−4.2
Molise	−11.3	−8.7	−18.3	−13.7	−25.8	−17.2	−21.9	−12.1	−14.5	−7.5
Campania	3.9	5.1	−1.9	−2.1	−18.9	−12.1	−24.0	−6.0	−30.9	−5.1
Apulia	−6.1	−4.9	−7.7	−5.3	−22.2	−12.8	−21.3	−7.7	−25.8	−6.2
Basilicata	−19.3	−13.7	−14.2	−11.8	−29.8	−24.2	−20.1	−6.9	−20.1	−8.9
Calabria	−15.7	−15.3	−15.1	−13.9	−29.9	−23.1	−23.7	−10.3	−27.1	−7.9
Sicily	−2.5	−2.5	−8.0	−5.0	−27.9	−14.1	−24.3	−6.7	−29.3	−4.7
Sardinia	−14.8	−8.2	−4.7	−2.3	−22.5	−14.5	−13.8	−1.2	−15.0	−8.0

Notes: The differences in per capita GDP are those on the Italian average (Italy = 100) displayed in table 1.
Sources: Elaborations from the online appendix B.

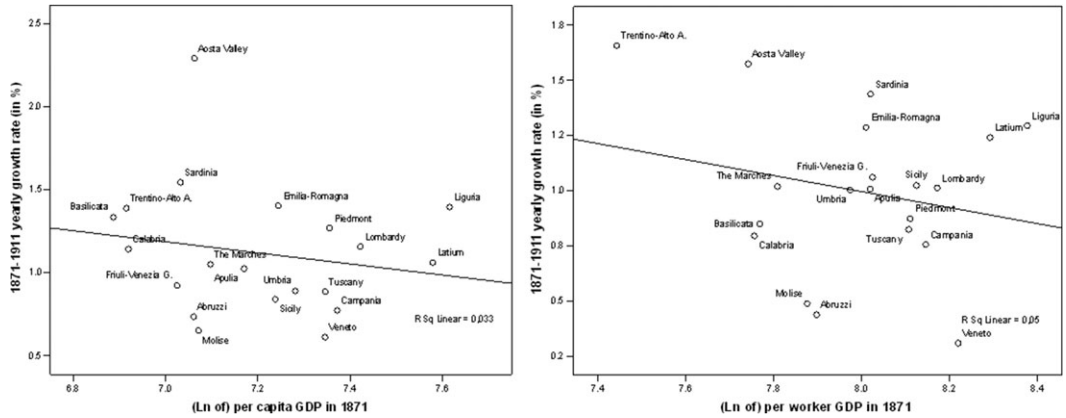

Figure 2. *Beta convergence in per capita and per worker GDP, 1871–1911*
Notes and Sources: *Elaborations from tables 1 and 2; standardized beta is −0.183 for per capita GDP, −0.224 for per worker GDP.*

backward areas but are beginning to develop a tourist sector and (in Trentino-Alto Adige) hydroelectricity. However, convergence is also due to the fact that very poor southern regions, such as Calabria and Basilicata, do not perform so bad, at least in GDP *per capita*:[14] it is not a coincidence that both Calabria and Basilicata are also regions with impressive emigration rates. On the other end, it is significant that all the regions with higher emigration (including Veneto in the North) perform bad in terms of GDP *per worker*: their relative good result in per capita GDP is due to increasing employment-to-population (lifted by the fact that hundreds of thousands of unemployed people were leaving the homeland),[15] not to structural change prompted by industrialization, which in fact was almost absent.[16] Campania, in the South, suffered the most from the hasty free-trade policies carried out in the years following the Unification, which severely damaged the (frail) industrial fabric of this region, as well as from the fact that Naples, which remained the biggest Italian city throughout the liberal age, lost the capital status (Pescosolido 1998, pp. 180–184;

[14] It is significant that their share of total GDP (over the Italian total) is instead decreasing: from 1871 to 1911, Basilicata's GDP shrank from 1.2. to 1.0 percent, Calabria's from 3.0 to 2.8, Abruzzi's from 2.5 to 2.0. Molise's from 1.1 to 0.7; the share of the entire South and islands went down from 33.0 to 30.9 percent.

[15] Massive emigration did not always play this role. In fact, a positive impact of massive emigration on the employment rate (on the assumption that people emigrating are mostly unemployed) can be more than counterbalanced by a negative impact on the activity rate. Which of the two forces is going to prevail depends on a number of other variables (such as unemployment, the amount and composition of the working age population and, behind that, fertility and mortality rates) whose discussion and measurement go beyond the scope of this paper. However, it is worth noticing that from 1901 to 1911 the southern regions with the highest emigration rate experienced a decline in the employment-to-population ratio, as a consequence of a decline in activity rates: for regional figures, at historical borders, see Cappelli *et al.* (2018). It is also worth reminding that a decline in employment-to-population can be a result of (arguably) positive changes, such as the decline in child labor and the extension of compulsory education: these were surely taking place in the liberal age and, as far as we know, the decline in child labor and the extension of compulsory education were in the South slower than in the Center-North (e.g., Felice 2013, pp. 41–49 and 117–123; Felice and Vasta 2015); this too contributed to the South's better performance in the employment-to-population ratio.

[16] For regional figures on international emigration during the liberal age, see Felice (2007, pp. 45–50). Among the first Italian scholars to point out to the benefits of emigration for the homeland regions, are Francesco Saverio Nitti (1968) and Benedetto Croce (1925, pp. 207–228). For up-to-date figures and analyses, see Ardeni and Gentili (2014) and Gomellini and O'Grada (2013).

De Matteo 2002, pp. 85–107): as a consequence, its growth rate was below the Italian average, and this also was a factor of divergence (given that in 1871 both its income and productivity lay above the Italian average).

The North-West in this period is doing well, which is a factor of divergence: the industrial triangle is taking shape, thus forging ahead.[17] However, the growth rate is not impressive, with the exception of Liguria, a relatively small region receiving significant State aid in shipbuilding and iron and steel industry. Both Lombardy and Piedmont harbor a variety of factories in sectors typical of either the first or the second industrial revolution (textiles, but also electricity, rubber, engineering, and even automobiles), but, not least due to the size of these regions, in aggregate terms the impact of these productions is still modest (Fenoaltea 2003a; Felice 2007, pp. 167–174): in average productivity, the lead of these regions is thin still, as confirmed by the fact that, in spite of a clear advantage in industrial specialization (table 7), in 1911 sectoral productivity is more important than industry mix (table 8). Outside the triangle, regions with little industrial basis such as Latium (in services) and Emilia-Romagna (in agriculture and related manufactures, as well as in mechanics) are also doing well. At the national level, both productivity growth and structural change remained limited, in the first decades after Unification, with some acceleration only in the 1901–1911 years.[18] When combined with the mitigation effect of foreign emigration, it should not come as a surprise that there was no room for significant changes in regional inequality: the small increase in regional dispersion measured by the Theil index is due entirely to productivity (table 6), and it is in line with the view of a slow takeoff of the Italian economy (Fenoaltea 2003b).

The interwar years (1911–1951)

Unlike the liberal age, the interwar years are a period of undisputed divergence: the standardized beta is positive for both income and (to a minor degree) productivity (figure 3).[19] Now the rise of the North-West is, above all, a rise of its two most important regions, Lombardy and Piedmont: and it is a three-fold rise, in income, productivity, as well as in employment-to-population (where instead Liguria is losing ground). Conversely, in per capita GDP all the southern regions are grouped at the bottom of the graph, in the left corner; Calabria and Basilicata, which performed relatively well in the liberal age, are now the worst ones in terms of convergence. Again in per capita GDP, we may see as all the regions of the North-East and Center are grouped in a vast area between the North-West and the *Mezzogiorno*: it is all the more noticeable, because if we exclude the three outliers of the NEC—each with its own peculiarities: the new regions from the Hapsburg empire Trentino-Alto Adige and Friuli-Venezia Giulia as top performers, and the capital region Latium as the worst one—all the others (Veneto, Emilia-Romagna, Tuscany, the Marches,

[17] While there is consensus that natural advantages were important at the beginning (e.g., Felice 2010a), there is still debate about the role of domestic market: for a favorable view, see A'Hearn and Venables (2013) and Daniele *et al.* (2016), for a skeptical one, with the avail of more refined data, see Missiaia (2016).

[18] See the online appendix B, as well as Broadberry *et al.* (2013).

[19] In this case, as in the next two exercises (Figures 4 and 5), the initial values (1911, 1951, 1971) are inherited from the past; however, by treating these intervals as separate cross-section regressions, corresponding to different historical periods (1911–1951, 1951–1971, 1971–2011) technically the endogeneity problem is avoided. For a discussion of the alternative panel data approach see Islam (1995); in Felice (2011, 2012) this has been applied to early GDP estimates for the Italian regions, at historical borders and with seven benchmarks (1891, 1911, 1938, 1951, 1971, 1981, 2001), in tests of conditional and unconditional convergence.

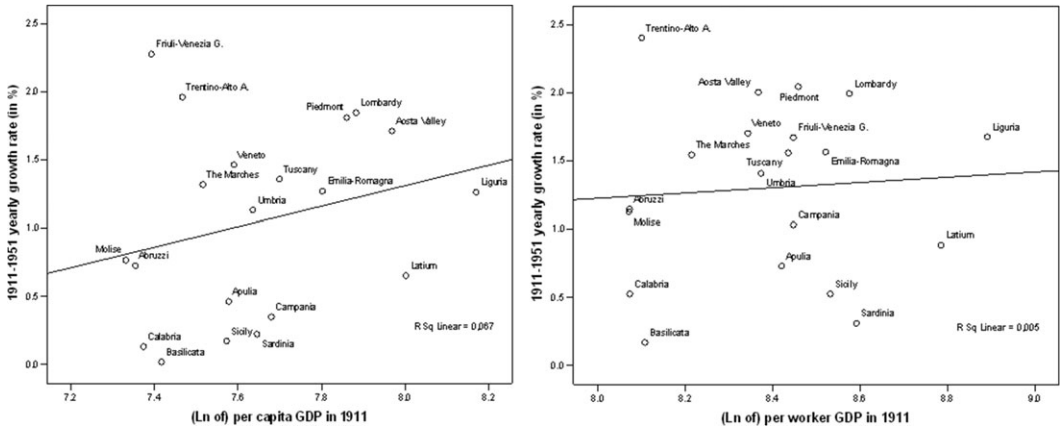

Figure 3. *Beta convergence in per capita and per worker GDP, 1911–1951*
Notes and Sources: *Elaborations from tables 1 and 2; standardized beta is 0.259 for per capita GDP, 0.072 for per worker GDP.*

and Umbria) stay in the middle, slightly above the Italian average, and very close to each other. With few exceptions (Friuli-Venezia Giulia), the trends in productivity are similar between the NEC and the *Mezzogiorno*: there is more dispersion than in the case of income, and yet still the NEC regions rank in the middle and slightly above the Italian average (again, without Trentino-Alto Adige, and Latium), those of South and islands at the bottom. We can therefore conclude that the evolution of regional inequality in this period follows, broadly speaking, a three-fold pattern—the North-West at the top, the North-East, and Center in the middle, the South and islands at the bottom—which is now much better defined than in the previous period: the outcome is the three-fold repartition by 1951 we have discussed in Section 2. With some differences and a little more diversification, productivity follows similar paths: according to the Theil index (table 6), this is in fact the sole contributor to the process of regional dispersion; but the divergence in average productivity is due, in turn, most of all to the industry mix (table 8), that is, to the shift from agriculture to industry (table 7). At the national level, productivity growth and structural change did occur in this period:[20] at the regional level, they concentrated in the North-West.[21]

In part, this outcome is due to the fact that the previous counterbalancing forces, namely, massive emigration, no longer work in this period and, therefore, can no more prevent the poorest regions from falling behind. In part, it is related to the changes caused by the Great war, which channeled public priorities and efforts toward the industry already in existence in the North-West; moreover, after the war the same factories had to be rescued with public funds (Zamagni 2002). Not least, this outcome is due to specific fascist policies: Mussolini's "battle of grain" favored in the South agricultural production intensive in land and not in labor, and thus in

[20] See again the online appendix B and Broadberry *et al.* (2013).

[21] At the NUTS I level, and historical borders (Cappelli *et al.* 2018), recently calculated a Caselli-Tenreyro decomposition, in order to explore whether labor-productivity convergence (or divergence) was determined by within- or between-sectors convergence, or by labor reallocation. The result adds quantitative evidence to our judgment, showing that in this period the North-West diverged in per worker productivity from all the other macro-areas, due to both divergence in within-sector productivity (within industry and agriculture) and to labor reallocation. However, there was convergence in the productivity of services, arguably due to the growth of public administration.

contrast with the factor endowments of that area (poor in land, but rich in labor) (e.g., Toniolo 1980, pp. 304–314); some land reclamation notwithstanding, a reform of extensive latifundia was avoided and thus agriculture was not modernized, while also internal migration, from South to North, at that time was under restriction. Starting in 1926 and more clearly after the 1929 crisis, autarchic policies and government restrictions to the opening of new plants also turned out to favor the industries already in existence and their territories, that is (mostly) the triangle—although some of these industries, particularly in chemicals, did undertake some modernization (Gualerni 1976; Felice 2015b, pp. 186–227). World War II and the Reconstruction had similar consequences, that is, they channeled resources toward the North-West and, in particular, toward those firms of the second industrial revolution able to grasp the opportunity of mass production: now crucially, and finally, also engineering and metallurgy (Balconi 1991; Fauri and Tedeschi 2011). In addition, World War II ended up damaging the industrial plants of the South, concentrated around Naples, more than those of the North (De Benedetti 1990, pp. 604–605). In short, international and unforeseeable events, such as the world wars and the 1929 crisis, were reinforced by national policies: not by chance, these latter went in favor of the different ruling élites of the countries, industrialists in the North and agrarian in the South (Gramsci 2005 (1951); Salvemini 1955; Felice 2013).

The golden age (1951–1971)

The graph of beta convergence for the golden age (figure 4) is, in many respects, specular to that for the previous period. It is a picture of convergence, in both income and productivity, a strong one indeed (standardized beta is −0.886 for per capita GDP, −0.914 for per worker GDP). Furthermore, it is worth noticing that we have once again the three-fold repartition, at least in income: all the regions of South and islands are at the top (they grow the most), all those of the North-East and Center in the middle, all those of the North-West at the bottom. In productivity, we observe something similar, the only difference being that the three-fold repartition is a bit less defined. It should be noticed that the contribution of productivity is stronger for southern Italy but is significant for the NEC regions as well: overall, the impressive reduction in dispersion recorded by the Theil index of GDP per capita from 1951 to 1971 (from 0.068 down to 0.031) is entirely due to the remarkable fall of inequality in GDP per worker (from 0.062 to 0.024, see table 6).

Such a convergence process is an exception in the entire history of post–unification Italy: it did not happen before, it would not happen again. Furthermore, it took place during the period of most intense growth of the Italian economy, that is, when also the leading North-West was growing as never before; for this reason, it seems at odds with theoretical predictions (both those from the neoclassical approach and the alternative new economic geography). How can be explained? On the one hand, in the North-East and Center, we have the beginning of a diffusive process: the spread of industry toward the bordering regions of the triangle—such as Emilia-Romagna, Veneto, Tuscany, and then the Marches—mostly in light manufactures, from textiles and clothing to light engineering (Fuà and Zacchia 1983; Bellandi 1999). This process, however, will gain momentum only from the 1970s onward, that is, after the crisis of the big firms more intensive in energy and capital (in fact, during the golden age the convergence of the NEC is relatively mild).

On the other hand, and here we have the most important factor, there is the Italian state actively intervening in the South, to promote first infrastructures and then industrialization—and therefore strongly altering the market rules (upon which both the competing theoretical

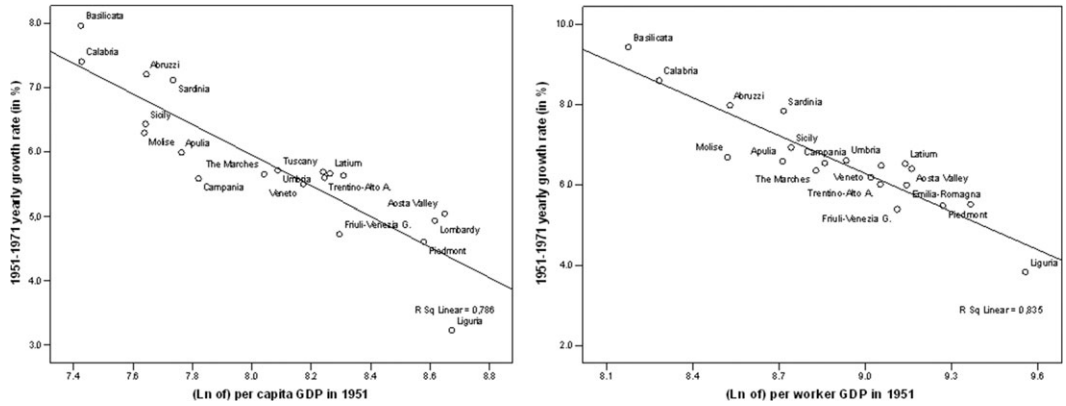

Figure 4. *Beta convergence in per capita and per worker GDP, 1951–1971*
Notes and Sources: *Elaborations from tables 1 and 2; standardized beta is −0.886 for per capita GDP, −0.914 for per worker GDP.*

predictions are based) in order to favor the convergence of the most backward regions (Felice 2007a, pp. 72–93). From 1957 until the mid-1970s, the state-owned *Cassa per il Mezzogiorno* financed in the South new plants in capital-intensive and highly productive industrial sectors (steel, chemicals, engineering, and electronics), mostly belonging to state-owned firms and, at a later stage, also to private big business (Fiat above all) (Felice 2010b; Felice and Lepore 2017): as a consequence, the South is converging not only in the share of industrial employment but also—and at a very impressive rate—in per worker productivity and particularly in industrial productivity (see the figures in the online appendix B). Therefore, convergence in average productivity (in turn the driver of convergence in income) is due not only to structural change, as widely recognized (Paci and Pigliaru 1998), but also to convergence in within-sector productivity:[22] as confirmed by a recent Caselli-Tenreyro decomposition at the NUTS I level, this latter occurred in industry above all and, especially in South and islands, was even more important than labor reallocation (Cappelli *et al.* 2018). Our results from the Hanna-Kim decomposition (table 8) now confirm this argument and, actually, they even reinforce it: it is in fact because of sectoral productivity that a significant reduction in GDP inequality, from 1951 to 1971, took place;[23] inequality in the industry mix was also declining (with the exception of Campania) but remained considerably higher.

A tale of two Italies (1971–2011)

The picture for the last period (figure 5) is, once again, dramatically different from the previous one—as from that of any other period. It is an entirely distinct scenario. First, there is

[22] Internal migration, from the South to the North, may also have played some role, but probably a minor one; actually, in this period the South fell back in terms of activity rates, and thus it could be argued that emigration could have been even negative, drawing away the most productive labor force; in any case, what caused convergence in per capita GDP was the growth of southern employment in industry and services, and the fact that this employment scored a high GDP per capita.

[23] It may be worth adding that, although to a minor extent, in this period Southern Italy is converging also in services productivity (see the online appendix B and Cappelli *et al.* (2018)), thanks among the others to the growth of public administration where per worker GDP tends to be, by construction, equal throughout the country.

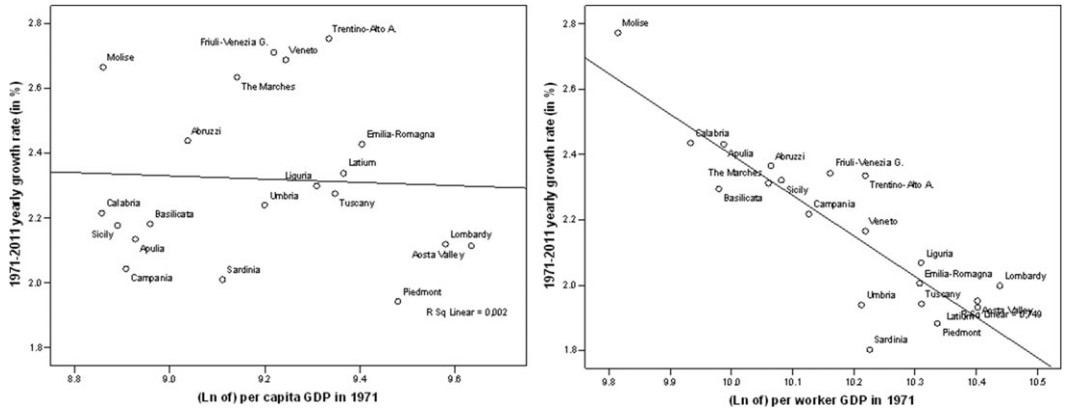

Figure 5. *Beta convergence in per capita and per worker GDP, 1971–2011*
Notes and Sources*: Elaborations from tables 1 and 2; standardized beta is −0.048 for per capita GDP, −0.865 for per worker GDP.*

a remarkable differentiation between per capita and per worker GDP, without precedents: in per capita GDP, practically we have no longer convergence (standardized beta is down to −0.048); conversely, in per worker GDP convergence continues, with quite a high value for standardized beta (−0.865). Second, and more precisely, the lack of convergence in per capita GDP is limited to the southern regions: those that grew the most in the previous decades (but that still lie behind in absolute terms) are now falling back. Conversely, the NEC regions—plus the small northernmost regions of the South, Abruzzi and Molise—continue to converge: in the left quadrant of figure 5, we observe all these regions above the fit line; all the other southern regions are below, in the left corner, and most of the North-West is also below, in the right corner. As a consequence of this process, as we have seen by the early twenty-first century Italy looks divided into two parts: a Center-North much more homogeneous internally, as never before, and a poorer South.[24]

Convergence was half-completed, we could say, that is it was (more or less) achieved for one of the two macro-areas behind the North-West. But it was half-convergence also because, for the South, it actually continued in one of the two components of per capita GDP, productivity. Of course you can see the glass half empty: there is, in this period, a dramatic falling back of southern Italy in the employment-to-population ratio (ten points are lost over the Italian average in 40 years, down to 77 percent of the Italian average, see table 3). This falling back is not due to activity rates (the working age population, 15–64 years old, divided by total population), where indeed there is still some convergence,[25] but to the employment rate (the employment divided by the working age population): on the one hand, from 1971 to 2011 male participation rates declined in South and islands, while they grew in the Center-North; on the other, the female participation rates grew in the *Mezzogiorno* more slowly than in the rest of the country, although from lower levels

[24] Broadly speaking, these results for per capita GDP are similar to those found by other authors, for instance, Brida *et al.* (2014) over the period 1970–2004, essentially with the same data. What is new, here, is the long-term picture and the differentiation between productivity and employment-to-population.

[25] It lasted until 2001. From 2001 to 2011, there was a mild divergence, due to a recovery of internal migration and to major foreign migration in the Center-North (Cappelli *et al.* 2018).

(Cappelli *et al.* 2018). The underdevelopment of southern Italy is now, essentially, a problem of unemployment.

In a certain sense, the falling behind of southern Italy is the other side of its previous convergence: those very capital-intensive plants, that were financed by the State and weaker than analogous plants in the North, collapsed with the oil shocks (e.g., Barbagallo and Bruno 1997). At the same time, however, the effectiveness of State intervention in the South went lost, because of growing political clientelism, wrong industrial choices, and even an increasing and at traits pervasive influence of organized crime (e.g., Felice 2013, pp. 112–116 and 149–163). This picture is well known, even beyond scholarly work. What is new, from our figures and in particular from the Hanna-Kim decomposition (table 8), is the fact that, from 1971 to 2011, the collapse of the industrialization strategy in the South had a stronger effect on the industry mix, compared to sectoral productivity: this latter continued to converge, in many regions, while the former diverged. Such a finding contrasts with previous studies stressing instead the role of structural change, but limited to the 1970s–1990s (Paci and Pigliaru 1997, 1998; Aiello and Scoppa 2000; Brugnoli and Fachin 2004); of course this means that from the 1990s to 2011 the South fell back in structural change, while sectoral productivity (for those who work) improved. In part, this result may be a consequence of the fact that (official) wages were set equal throughout the country: a territorial wage differentiation (the so-called *gabbie salariali*), introduced in 1945, was abolished between 1969 and 1972, and never reintroduced. On the one hand, in expanding tertiary sectors such as public administration (where "real" per worker output cannot be measured), by law equal national wages levelled per worker GDP figures, independently of real productivity. On the other hand, they contributed to create a structural wage cost handicap in the South, which discouraged investments: in the face of long-lasting socio-institutional differences (resulting into lower human capital, different ethics, more bureaucracy and worse infrastructures in the *Mezzogiorno*) (Felice 2018), national wages were the wrong solution, leading to lower employment in the South (e.g., Manacorda and Pietrongolo 2006)[26] and to enduring differences in the industry mix—which in turn made that on the whole the contribution of productivity to the dispersion of per capita GDP remained significant, although in decline (table 6).

Of course, in sharp contrast to the falling back of the *Mezzogiorno*, stands the convergence of the NEC: it is a convergence of ongoing industrialization, led by small and later on by medium-sized firms, at first organized in industrial districts (Becattini 1979),[27] then evolving in the so-called "fourth capitalism" (medium-sized, highly international firms emerging from their former districts) (Colli 2002). In line with the post–Fordist scenario, the relevant sectors are, broadly speaking, light manufactures intensive in labor (from textiles and apparel to light engineering, but also food and beverage, furniture, sundry

[26] Other social benefits may have prevented emigration from the South, thus also keeping low the employment rate, but probably they played a minor role: in Italy, the bulk of social benefits took the form of pensions for retired people and thus—although initially many recipients were indeed below the 65-year threshold—their impact was above all on the activity rate rather than on the employment rate; subsidies for unemployed young people, which indeed did impact on the employment rate, were in Italy very limited in comparison to other European countries (Ferrera *et al.* 2012). On the other hand, in the South the employment rate is lowered by the fact that many unemployment young people tend to live with their parents: the rise of retirement age in 1992 increased this percentage, by raising the disposable income of the parents who forcedly remained longer in the labor market, and who had a taste for coresidence with their children (Manacorda and Moretti 2006).

[27] On the social and economic characteristics of the so-called "third Italy", see also Bagnasco (1977) and Trigilia (1986).

manufactures), and this explains why the NEC performs much better in employment-to-population than in productivity. Related to this is the fact that the NEC regions have a slightly larger service sector, which also is less productive than in the North-West, of Lombardy in particular (see table 8 and table B.9 in the online appendix B)—as it is less productive at the national level (Broadberry *et al.* 2013).

6. Concluding remarks

The article has presented long-run GDP estimates for Italy's regions, spanning from around the unification of the country (1871) until our days (2011). For the first time, all the estimates have been produced at present borders (NUTS II level) and at 10-year regular intervals (with just one exception, 1938 instead of 1941), they are accompanied by a thorough description of sources and methods and are integrated by equally comprehensive figures of productivity and employment, for the total economy and its three branches (agriculture, industry, and services). They constitute a novel and broad data source, arguably the essential basis for further analyses; but they also provide, in themselves, crucial insights for our understanding of Italy's regional development.

In comparison with previous studies, which traditionally emphasize the formation of the North-South divide in the first half of the twentieth century (e.g., Iuzzolino *et al.* 2013), the new figures underline the specific patterns of three macro-regions (North-West, North-East and Center, South and islands) and a different timing. With the avail of the Williamson's indices of regional dispersion and the Moran's global and local indices of spatial autocorrelation, we may now qualify the Italian long-run regional development as a two-stage process: first, we observe the formation of "three Italies", in the first half of the twentieth century; then, the establishment of the North-South divide, in the last decades. Starting from a situation of unclear geographical polarization, by the end of the nineteenth century a slow industrial takeoff began, concentrated in the North-West, which results in the "mild divergence" of the liberal age (1871–1911); this process accelerated through the two world wars and the interwar years, marking the "strong divergence" of this period (1911–1951), so much so that by the eve of the economic miracle, in 1951, the three macro-regions—North-West, North-East, and Center, South and islands—are clearly defined in terms of GDP. After a brief parenthesis during the economic miracle, characterized by "general convergence" (1951–1971), in the last 40 years the North-East and Center continued to converge toward the North-West, while South and islands fell behind: this led to the formation of "two Italies" (1971–2011) in terms of per capita GDP, the Center-North on the one hand, South and islands on the other.

This dual outcome can be regarded as peculiar of Italy's regional development, at least in European perspective. Over the long run, comparable GDP estimates are available for the other two countries of Latin Europe and a similar size, France and Spain: in both we observe an increasing polarization between one or a couple of leading regions and all the others (Díez-Minguela *et al.* 2017, p. 14). For what concerns the other two main countries of Western Europe, Germany and the United Kingdom, in the former the East-West divide is nowadays less profound than the North-South divide in Italy, while in the United Kingdom, outside the capital area, regional inequalities are not particularly pronounced and there is no geographical polarization (Annoni *et al.* 2017; Eurostat 2017). Italy alone has developed a dual, clear divide between a well-defined group of regions above the average (those in the Center-North, except Umbria) and an equally well-defined group of

regions below them, which in the last decades explains almost all of the high regional dispersion observed in this country (Brunetti *et al.* 2017, p. 282).

In light of our results, we can also add something on the debate about the determinants of the North-South divide. Sigma and beta convergence have been tested for GDP per capita, productivity (GDP per worker) and employment-to-population, for the whole period (1871–2011) as well as for the four subperiods mentioned above; in order to exactly quantify the contributions of GDP per worker and employment-to-population, the Theil decomposition has been computed; and in order to distinguish between sectoral productivity and industry mix, the Hanna-Kim decomposition of differences in per capita GDP has been calculated. Productivity is the main driver behind both the initial divergence in favor of the North-West (1891–1951, but above all in the interwar years) and the subsequent convergence of the economic miracle. In turn, this is due—above all—first to divergence in structural change (1911–1951), then to convergence in sectoral productivity (1951–1971). In the last 40 years, however, the North-South divergence is due to rising inequality in the employment-to-population ratio (because of lower employment rate) and to sluggish structural change. This last result suggests that the reason of the persisting North-South divide must be searched in conditioning social and institutional factors (higher costs due to differences in institutions and culture, and to lower human capital), combined with specific policies at the national level (among these, setting wages equal throughout the country, which created a structural wage cost handicap): they prevented structural change from fully taking place in the South, and helped maintain the employment rate low. Further research, including estimates at the provincial level (NUTS III) and a testing of conditioning variables in the long-run, will be crucial in order to corroborate these findings.

Supplementary material

Supplementary material is available at *European Review of Economic History* online.

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References

Aguilar-Retureta, J. (2015). The GDP per capita of the Mexican regions (1895–1930): new estimates. *Revista de Historia Económica/Journal of Iberian and Latin American Economic History* **33**(3), pp. 387–423.

Aiello, F. and Scoppa, V. (2000). Uneven regional development in Italy: explaining differences in productivity levels. *Giornale degli Economisti e Annali di Economia* **60**(2), pp. 270–98.

Annoni, P., Dijkstra, L. and Gargano, N. (2017). "The EU Regional Competitiveness Index 2016." European Commission Working Papers, 02/2017.

Ardeni, P.G. and Gentili, A. (2014). Revisiting Italian emigration before the Great War: a test of the standard economic model. *European Review of Economic History* **18**(4), pp. 452–71.
A'Hearn, B. and Venables, A.J. (2013). Regional disparities: internal geography and external trade. In Toniolo G. (ed.), *The Oxford Handbook of the Italian Economy Since Unification*. Oxford: Oxford University Press, pp. 599–630.
Badià-Miró, M. (2015). The evolution of the location of economic activity in Chile in the long run: a paradox of extreme concentration in absence of agglomeration economies. *Estudios de Economía* **42**(2), pp. 143–67.
Badià-Miró, M., Guilera, J. and Lains, P. (2012). Regional incomes in Portugal: industrialization, integration and inequality, 1890–1980. *Revista de Historia Económica / Journal of Iberian and Latin American Economic History* **30**(2), pp. 225–44.
Bagnasco, A. (1977). *Tre Italie. La Problematica Territoriale dello Sviluppo Italiano*. Bologna: il Mulino.
Balconi, M. (1991). *La siderurgia italiana (1945–1990). Tra Controllo Pubblico ed Incentivi del Mercato*. Bologna: il Mulino.
Barbagallo, F. and Bruno, G. (1997). Espansione e Deriva del Mezzogiorno. In Barbagallo F. (ed.), *Storia dell'Italia Repubblicana, vol. III. L'Italia Nella Crisi dell'ultimo Ventennio. 2. Istituzioni, Politiche, Culture*. Turin: Einaudi, pp. 399–470.
Barro, R.J. and Sala-i-Martin, X. (1992). Convergence. *Journal of Political Economy* **100**(2), pp. 223–51.
Barro, R.J. and Sala-i-Martin, X. (2004). *Economic Growth* (2nd edition). Cambridge, (MA): Massachusetts Institute of Technology.
Becattini, G. (1979). Dal 'settore' industriale al 'distretto' industriale. Alcune considerazioni sull'unità di indagine dell'economia industriale. *Rivista di Economia e Politica Industriale* **5**(1), pp. 7–21.
Bellandi, M. (1999). 'Terza Italia' e 'distretti industriali' dopo la Seconda guerra mondiale. In Amatori F., Bigazzi D., Giannetti R. and Segreto L. (eds), *Storia d'Italia. L'industria*. Turin: Einaudi, pp. 841–91.
Brida, J.G., Garrido, N. and Mureddu, F. (2014). Club performance dynamics at Italian regional level. *Regional and Sectoral Economic Studies* **14**(1), pp. 47–76.
Broadberry, S.N., Giordano, C. and Zollino, F. (2013). Productivity. In Toniolo G. (ed.), *The Oxford Handbook of the Italian Economy since Unification*. Oxford: Oxford University Press, pp. 187–226.
Brugnoli, A. and Fachin, S. (2004). Convergenza e divergenza della produttività settoriale del lavoro nelle regioni italiane, 1980–1995. *Rivista di Politica Economica* **94**(2), pp. 103–28.
Brunetti, A., Felice, E. and Vecchi, G. (2011). Reddito. In Vecchi G. (ed.), *In Ricchezza e in Povertà. Il Benessere Degli Italiani dall'Unità a Oggi*. Bologna: il Mulino, pp. 209–34.
Brunetti, A., Felice, E. and Vecchi, G. (2017). Income. In Vecchi G. (ed.), *Measuring Wellbeing. A History of Italian Living Standards*. Oxford: Oxford University Press, pp. 255–92.
Buyst, E. (2010). Reversal of fortune in a small, open economy: regional GDP in Belgium, 1896–2000. *Rivista di Storia Economica* **26**(1), pp. 75–92.
Cappelli, G., Felice, E., Martínez-Galarraga, J. and Tirado, D. [2018]. "Still a long way to go: decomposing income inequality across Italy's regions, 1871–2011." *EHES Working Papers in Economic History*, 123.
Ciccarelli, C. and Fenoaltea, S. (2009). *La Produzione Industriale delle Regioni d'Italia, 1861–1913: Una Ricostruzione Quantitativa. 1. Le Industrie non Manifatturiere*. Rome: Bank of Italy.
Ciccarelli, C. and Fenoaltea, S. (2012). La cliometria e l'unificazione italiana: bollettino dal fronte. *Meridiana* **73/74**(1–2), pp. 258–66.
Ciccarelli, C. and Fenoaltea, S. (2014). *La Produzione Industriale delle Regioni d'Italia, 1861–1913: Una Ricostruzione Quantitativa. Vol. 2, Le Industrie Estrattivo-manifatturiere*. Rome: Bank of Italy.
Colli, A. (2002). *Il Quarto Capitalismo. Un Profilo Italiano*. Venice: Marsilio.
Crafts, N. (2005). Regional GDP in Britain, 1871–1911: some estimates. *Scottish Journal of Political Economy* **52**(1), pp. 54–64.

Croce, B. (1925). *Storia del Regno di Napoli*. Bari: Laterza.
Daniele, V. and Malanima, P. (2007). Il prodotto delle regioni e il divario Nord-Sud in Italia (1861–2004). *Rivista di Politica Economica* **67**(nos. 3–4), pp. 267–315.
Daniele, V., Malanima, P. and Ostuni, N. (2016). "Geography, market potential and industrialization in Italy 1871–2011." *Papers in Regional Science*, forthcoming, 5 DEC 2016, DOI: 10.1111/pirs.12275.
De Benedetti, A. (1990). Il sistema industriale (1880–1940). In Macry P. and Villani P. (eds), *Storia d'Italia. Le Regioni. La Campania*. Turin: Einaudi, pp. 445–605.
De Matteo, L. (2002). *«Noi della meridionale Italia». Imprese e imprenditori del Mezzogiorno nella crisi dell'unificazione*. Naples: Edizioni Scientifiche Italiane.
Díez-Minguela, A., González-Val, R., Martinez-Galarraga, J., Sanchis, M.S. and Tirado, D.A. (2017). "The long-term relationship between economic development and regional inequality: South-West Europe, 1860–2010." EHES Working Papers in Economic History, 119.
Q12 Ellena, V. (1880). *"La statistica di alcune industrie italiane."* Annali di Statistica (Second series). Tip.
Q13 Eredi Botta, pp. 1–141.
Enflo, K. and Rosés, J.R. (2015). Coping with regional inequality in Sweeden: structural change, migration and policy, 1860–2000. *The Economic History Review* **68**(1), pp. 191–217.
Eurostat (2017). "GDP at regional level." http://ec.europa.eu/eurostat/statistics-explained/index.php/GDP_at_regional_level (last access on February 2018).
Fauri F. and Tedeschi P. (eds) (2011). *Novel Outlooks on the Marshall Plan. American aid and European Re-industrialization*. Bruxelles: Peter Lang.
Federico, G. (2003). Le nuove stime della produzione agricola italiana, 1860–1910: primi risultati e implicazioni. *Rivista di Storia Economica* **19**(3), pp. 359–81.
Federico, G. (2007). Ma l'agricoltura meridionale era davvero arretrata? *Rivista di Politica Economica* **97**(2), pp. 317–40.
Felice, E. (2005a). Il reddito delle regioni italiane nel 1938 e nel 1951. Una stima basata sul costo del lavoro. *Rivista di Storia Economica* **21**(1), pp. 3–30.
Felice, E. (2005b). Il valore aggiunto regionale. Una stima per il 1891 e per il 1911 e alcune elaborazioni di lungo periodo (1891–1971). *Rivista di Storia Economica* **21**(3), pp. 83–124.
Felice, E. (2007). *Divari Regionali e Intervento Pubblico. Per una Rilettura dello Sviluppo in Italia*. Bologna: il Mulino.
Felice, E. (2009). "Estimating Regional GDP in Italy (1871–2001): Sources, Methodology, and Results." Universidad Carlos III de Madrid, Departamento de Historia Económica e Instituciones, Working Papers in Economic History, 7.
Felice, E. (2010a). Regional development: reviewing the Italian mosaic. *Journal of Modern Italian Studies* **15**(1), pp. 64–80.
Felice, E. (2010b). State ownership and international competitiveness: the Italian Finmeccanica from Alfa Romeo to Aerospace and Defence. *Enterprise and Society* **11**(3), pp. 594–635.
Felice, E. (2011). Regional value added in Italy, 1891–2001, and the foundation of a long term picture. *The Economic History Review* **64**(3), pp. 929–50.
Felice, E. (2012). Regional convergence in Italy (1891–2001): testing human and social capital. *Cliometrica* **6**(3), pp. 267–306.
Felice, E. (2013). *Perché il Sud è rimasto indietro*. Bologna: il Mulino.
Felice, E. (2014). Il Mezzogiorno fra storia e pubblicistica. Una replica a Daniele e Malanima. *Rivista di Storia Economica* **30**(2), pp. 197–242.
Felice, E. (2015a). La stima e l'interpretazione dei divari regionali nel lungo periodo: i risultati principali e alcune tracce di ricerca. *Scienze Regionali/Italian Journal of Regional Science* **14**(3), pp. 91–120.
Felice, E. (2015b). *Ascesa e Declino. Storia Economica d'Italia*. Bologna: il Mulino.
Felice, E. (2016). GDP and convergence in modern times. In Diebolt C. and Haupert M. (eds), *Handbook of Cliometrics*. Berlin Heidelberg: Springer-Verlag, pp. 263–93.
Felice, E. (2018). The socio-institutional divide: explaining Italy's long-term regional differences. *Journal of Interdisciplinary History* **49**(1), pp. 43–70.

Felice, E. and Lepore, A. (2017). State intervention and economic growth in Southern Italy: the rise and fall of the 'Cassa per il Mezzogiorno' (1950–1986). *Business History* **59**(3), pp. 319–41.
Felice, E. and Vasta, M. (2015). Passive modernization? the new human development index and its components in Italy's regions (1871–2007). *European Review of Economic History* **19**(1), pp. 44–66.
Felice, E. and Vecchi, G. (2015a). Italy's growth and decline, 1861–2011. *Journal of Interdisciplinary History* **45**(4), pp. 507–48.
Felice, E. and Vecchi, G. (2015b). "Italy's modern economic growth, 1861–2011. *Enterprise and Society* **16**(2), pp. 225–48.
Fenoaltea, S. (2003a). Peeking backward: regional aspects of industrial growth in post-unification Italy. *Journal of Economic History* **63**(4), pp. 1059–1102.
Fenoaltea, S. (2003b). Notes on the rate of industrial growth in Italy, 1861–1913. *Journal of Economic History* **63**(3), pp. 695–735.
Ferrera, M., Fargion, V. and Jessoula, M. (2012). *Alle Radici del Welfare all'Italiana. Origini e Futuro di un Modello Sociale Squilibrato*. Venice: Marsilio.
Fuà, G. and Zacchia, C. (1983). L'industrializzazione nel Nord-Est e nel Centro. In Fuà G. and Zacchia C. (eds), *Industrializzazione Senza Fratture*. Bologna: il Mulino, pp. 7–46.
Geary, F. and Stark, T. (2002). Examining Ireland's post-famine economic growth performance. *The Economic Journal* **112**(482), pp. 919–35.
Geary, F. and Stark, T. (2015). Regional GDP in the UK, 1861–1911: new estimates. *The Economic History Review* **68**(1), pp. 123–44.
Gomellini, M. and O'Grada, C. (2013). Migrations. In Toniolo G. (ed.), *The Oxford Handbook of the Italian Economy Since Unification*. Oxford: Oxford University Press, pp. 271–302.
Gramsci, A. (2005). In De Felice F. and Parlato V. (eds), *La Questione Meridionale (1951)*. Rome: Editori Riuniti.
Gualerni, G. (1976). *Industria e Fascismo. Per una Interpretazione dello Sviluppo Economico Italiano tra le due Guerre*. Milan: Vita e pensiero.
Hanna, F. (1951). Contribution of manufacturing wages to differences in per capita income. *Review of Economics and Statistics* **33**(1), pp. 18–28.
Henning, M., Enflo, K. and Andersson, F. (2011). Trends and cycles in regional economic growth: how spatial differences formed the Swedish growth experience 1860–2009. *Explorations in Economic History* **48**(4), pp. 538–55.
Islam, N. (1995). Growth empirics: a panel data approach? *The Quarterly Journal of Economics* **110**(4), pp. 1127–70.
Iuzzolino, G., Pellegrini, G. and Viesti, G. (2011). "Convergence among Italian Regions, 1861–2011." Bank of Italy, Economic History Working Papers, 22.
Iuzzolino, G., Pellegrini, G. and Viesti, G. (2013). Regional convergence. In Toniolo G. (ed.), *The Oxford Handbook of the Italian Economy since Unification*. Oxford: Oxford University Press, pp. 571–98.
Kim, S. (1998). Economic integration and convergence: U.S. regions, 1840–1987. *Journal of Economic History* **58**(3), pp. 659–83.
Manacorda, M. and Moretti, E. (2006). Why do most Italian youths live with their parents? intergenerational transfers and household structure. *Journal of the European Economic Association* **4**(4), pp. 800–29.
Manacorda, M. and Pietrongolo, B. (2006). Regional mismatch and unemployment: theory and evidence from Italy, 1997–1998. *Journal of Population Economics* **19**(1), pp. 137–62.
Martínez-Galarraga, J., Rosés, J.R. and Tirado, D.A. (2015). The long-term patterns of regional income inequality in Spain (1860–2000). *Regional Studies* **49**(4), pp. 502–17.
Missiaia, A. (2016). Where do we go from here? Market access and regional development in Italy (1871–1911). *European Review of Economic History* **20**(2), pp. 215–41.
Nitti, F.S. (1968). Scritti sulla questione meridionale, vol. IV. In Villari P. and Massafra. A. (eds), *Inchiesta sulle condizioni dei contadini in Basilicata e in Calabria (1910)*. Bari: Laterza.

Paci, R. and Pigliaru, F. (1997). Structural change and convergence: an Italian regional perspective. *Structural Change and Economic Dynamics* **8**(3), pp. 297–318.
Paci, R. and Pigliaru, F. [1998]. "Growth and sectoral dynamics in the Italian regions." CRENoS, Working Paper, 98-3.
Pescosolido, G. (1998). *Unità Nazionale e Sviluppo Economico. 1750–1913*. Rome-Bari: Laterza.
Piketty, T. (2014). *Capital in the Twenty-first Century*. Cambridge (MA): Belknap Press.
Robinson, J. (2013). *Why Regions Fail: The Mexican Case*. Cambridge (MA): Harvard University Case Study.
Rosés, J.R., Martínez-Galarraga, J. and Tirado, D.A. (2010). The upswing of regional income inequality in Spain (1860–1930). *Explorations in Economic History* **47**(2), pp. 244–57.
Rosés J.R. and Wolf N. (eds) (forthcoming). *The Economic Development of Europe's Regions. A Quantitative History Since 1900*. London: Routledge.
Salvemini, G. (1955). *Scritti Sulla Questione Meridionale: 1896–1955*. Turin: Einaudi.
Sanchis, M.T. and Rosés, J.R. [2015]. "Regional inequality in France 1860–2010: Structural Change Dynamics." *Paper presented at the International Conference on Regional Science, Universitat Rogira i Virgili (Spain)*, November 18–20.
Schulze, M.S. (2007). "Regional Income Dispersion and Market Potential in the Late Nineteenth Century Hapsburg Empire." London School of Economics Working Papers, 106.
Toniolo, G. (1980). *L'economia dell'Italia Fascista*. Rome-Bari: Laterza.
Trigilia, C. (1986). *Grandi Partiti e Piccole Imprese. Comunisti e Democristiani Nelle Regioni a Economia Diffusa*. Bologna: il Mulino.
Williamson, J.G. (1965). Regional inequality and the process of national development: a description of the patterns. *Economic Development and Cultural Change* **13**(4), pp. 3–84.
Zamagni, V. (2002). La grande guerra come elemento di rottura della crescita equilibrata dell'economia italiana. In Garcia Sanz F. (ed.), *España e Italia en la Europa Contemporánea: desde Finales del siglo XIX a las DIctaduras*. Csic: Madrid, pp. 323–34.