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# Estimating regional Gdp in Italy (1871-2001): sources, methodology, and results

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### **Abstract**

This paper presents new estimates of Italian regional GDP for the years 1871, 1881, 1891, 1901, 1911, 1938 and 1951. This allows us to draw a long term picture of regional development of the country, from the years following national unification to the advent of Euro in 2001.

**Keywords:** Industrialization, regional inequality, regional income, economic growth.

**JEL Classification:** N93; N94; R11

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## *Estimating regional Gdp in Italy (1871-2001): sources, methodology, and results*

### **1. Introduction**

Regions – within or across national states – can be seen as the fundamental stage set of economic history, following Pollard (1981) and others, yet in the case of regions we have to face with more data problems than with national states, first of all the widespread lack of direct accounting income estimates for the period before world war II. A possible solution can be that of bypassing income estimates, trying to make the best of workforce and employment data, which instead are available on a regional basis already from the second half of the XIX century. Another one is producing regional income estimates through indirect procedures, based on employment and wage data as well as on a variety of other sources, such as production, equipment, or taxation.

Italy is one of the big European economies where by the end of the XIX century industrialization and economic development proceeded in a regionally uneven way, thus producing territorial disparities. Economic historians' first attempts to build indirect estimates of regional income date back to the 1970s, with the pioneering work by Vera Zamagni (1978) referring to 1911, then continued up to our days with the works, among others, by Alfredo Giuseppe Esposto (1997) and Stefano Fenoaltea (2003a, 2003b, 2004, see also 2006 for an overview); along these lines, most recent estimates have produced new and more reliable results for four benchmark years spanning from the end of the XIX century up to 1951 (Felice 2005a, 2005b).

This paper presents those recent estimates of mine – referring to 1891, 1911, 1938 and 1951 – along with new ones for other three benchmark years, 1901, 1881 and (still preliminary) 1871. This allows us to draw a long term picture of regional development in Italy, from the years following national Unification to the advent of Euro in 2001, a picture which will be briefly discussed.

The basic concepts about sources and methodological issues are exposed in the next paragraph (§2), while for a more detailed and comprehensive account reference must be made to the final appendix. Along with value added figures (paragraphs §3 and §4), data are presented on a per worker basis, as a total and for the three economic sectors (paragraph §5). In paragraph §6 the share of economically active population and of agricultural employment is discussed and the last paragraph (§7) shows estimates about the different contributions of productivity and active population to per capita income convergence/divergence regional trends.

## 2. Old and new estimates: some methodological notes

Direct and indirect estimates of regional income span from 1871 to 2001, through benchmark years. Direct regional accounts are available only for the last thirty years, corresponding to four benchmark years: 1971 (Svimez 1993), 1981, 1991 (Istat 1995) and 2001 (Istat 2006). For the previous years (1871, 1881, 1891, 1901, 1911, 1938, 1951) regional income is estimated through an indirect procedure, pioneered by Geary and Stark: for each sector national value added is allocated according to the corresponding regional share of employment, then regional wages are employed to allow for productivity disparities (Geary and Stark 2002; see also Crafts 2004). Conceptually straightforward, the methodology needs many qualifications when transferred into practice, at least in the case of the Italian regions: a more accurate outline of sources, data and hypotheses introduced in this paper is reported in the final appendix; in what follows I am going to expose the basic concepts.

For what regards the benchmark years from 1871 until 1951, estimates referring to 1891, 1911, 1938 and 1951 have been already published in my previous works (Felice 2005a, 2005b, 2007a).

Concerning industry and services, these estimates allocate national value added according to the regional share of employment (when possible derived from both the industrial and the population censuses, to allow for underemployment), at a very detailed sub-sector breakdown (see table A.2 in the appendix). For 1891 and 1911, the resulting regional figures, which I have called VA 1, are then corrected through estimates of women's and children's wages, to allow for differences in the age/composition of the workforce; the resulting VA 2 estimates are again corrected using regional nominal wages, in order to approximate differences in productivity, although at a sector breakdown less accurate than in the case of VA 1 and VA 2 (see table A.4 in the appendix): the resulting VA 3 estimates must be regarded as the final ones<sup>1</sup>.

In the case of agriculture, the approach used is different, since for this sector we had new direct accounting estimates of regional total saleable production, by Giovanni Federico (Federico 2003a): these have been transformed into value added under the hypothesis of three different shares of costs, in accordance with the agricultural regime (intensive production, sharecropping, extensive production) prevailing in each Italian region. Another exception is the textile sector for 1891 and 1911: here regional value added have been taken from Fenoaltea's new estimates (Fenoaltea 2004), which allocate national value added according to the share of employment as well as to evidence on equipment, on a detailed sector breakdown.

This paper presents new estimates of regional value added referring to 1871, 1881 and 1901. Which are the sources to produce estimates for those benchmark years? We have detailed data of regional workforce, from the 1871, 1881 and 1901 Censuses of Population; as well as national value added estimates, from Fenoaltea (2003a, 2005) and Federico (2003b), although not as detailed as in the case of 1891 and 1911: this involves that for 1871, 1881 and 1901 the sector breakdown of VA 1 and VA 2 must be less accurate (see table A.2 in the final appendix). Also we have Fenoaltea's textile regional estimates, the same we made use of in 1891 and 1911, which can be regarded as quite reliable and used to estimate sector productivity disparities in textile as well as in the other industrial sectors. Needless to say, we have 1891 and 1911 estimates, from which interpolations or extrapolations may be tried. For the housing sector, we have direct accounting estimates from taxation, as it was the case also for 1891, 1911, 1938 and 1951. However, compared with 1891 and 1911 there are at least two serious obstacles. First, for agriculture we do not have direct accounting regional estimates of gross saleable production: for this sector, we can only rely on the quantities of the main products. The other serious obstacle is that we do not have regional wage estimates, a part from a few sectors (mining for 1871, communications for 1881).

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<sup>1</sup> For 1938 and 1951, VA 2 estimates were not necessary, since productivity was approximated through the total amount of wages, which incorporated also the age/sex workforce breakdown.

I have tried to make the best use of the available data in order to produce 1871, 1881 and 1901 estimates of regional value added, which however should be regarded as less reliable than the 1891, 1911, 1938 and 1951 ones. The first problem is agriculture, where regional total production has been derived from the quantity of the main products, under the hypothesis that the regional ratio total production/main products was the same as in 1891 (for 1881 and 1871), or in between that of 1891 and 1911 (for 1901)<sup>2</sup>. Admittedly, this is not at all a safe hypothesis: for example, the increase of some ‘known’ productions could have occurred at the expense of others ‘unknown’, thus resulting into a decrease of the regional ratio. Yet we are making another hypothesis, with possible counterbalancing effects on the previous one: in 1871, 1881 and 1901, the value of the saleable production of the main (known) products is estimated according to the shares of total saleable production which these products scored in 1891 and 1911. Hence national shares matter as well: if an increase in the regional production of, say, wheat (known) is at the expenses of, say, meat (unknown), this regional change would also produce a change in the national shares of total saleable production, with a consequent second alteration; two alterations (regional and national) which may well counterbalance each other, on the condition that changes in the ratio total production/main products were equal among the Italian regions and so equal to the national average. This is indeed our hypothesis<sup>3</sup>. After all, we are estimating regional percentages of the Italian average, that is regional (gross saleable) production under the constraint that national total is fixed.

The other main problem is estimating productivity for industry and services. For industry, the solution proposed is based on the comparison between Fenoaltea’s new textile estimates and his previous ones (which did not allow for regional productivity differences): the hypothesis is that in 1871 and in 1881 productivity regional disparities of each *i* industrial sector scored the same ratio with textile disparities as in 1891 (in 1901, as the interpolation of 1891 and 1911 ratios). In the case of 1881, for example, they follow the equation:

$$[1] \Delta P_{yi1881} = \Delta P_{yt1881} * (\Delta P_{yi1891} / \Delta P_{yt1891})$$

where *y* is the region, *P* is productivity,  $\Delta$  is the difference compared to the Italian average and *t* is textile sector. Thus my industrial estimates allow for regional productivity disparities within each of all the industrial sector, unlike Fenoaltea’s estimates which consider productivity disparities only in the case of textiles. In my paper, the basic idea is that productivity disparities within the other industrial sectors were correlated with textiles disparities in a similar way they were in 1891 or 1911.

Concerning services, equation [1] has been extended also to the transport sector (plus communication in 1871, since it was impossible to keep it separate). In the case of 1881, for other services sectors the same equation has been employed using instead of textile the average productivity of communication and credit (as in 1891 and 1911, productivity of the credit sector has been derived from per capita savings, for further details see Felice 2005b). In the case of 1901, productivity of each sector of the services has been interpolated between 1891 and 1911. 1871 is more problematic, since for this benchmark year we do not have statistical data – such as per capita savings – from which to derive productivity estimates: the two possible viable alternatives produce different results, which deserve to be shown and discussed separately, as in the next paragraph.

Although they may be less reliable than 1891 and 1911 ones, it should be considered that 1901, 1881 and (partially) 1871 new estimates fill up a gap in the Italian regional accounting. Until now no regional estimates were available for those years, which include the period immediately following Unification; for those crucial decades we could only refer to general estimates of the North-South divide, with no regional breakdown.

<sup>2</sup> As Vera Zamagni pointed out already in 1975, data based on the main productions tend to underestimate promiscuous agriculture and thus mainly the sharecropping yields (Zamagni 1975).

<sup>3</sup> Neither this a safe one, indeed: the agrarian crisis, for example, may have had different regional impacts on the ratio total production/main products; but this is a matter of further research.

Finally, it is worth stressing that for many sectors, from 1871 to 1951, productivity is estimated through nominal wages. This entails a different kind of problems: data should be adjusted to allow for differences in the consumer price levels, yet at the present we lack of the necessary information to build reliable regional price indices, with reference to all the 1871-1951 period. However, looking at some specific price data – house rents, some basic foods, in Giusti (1914) and Maic (various years) respectively – in a few towns, it seems plausible that in the years previous to world war I consumer price levels were not so different across the Italian regions, for sure not clearly higher in the North. Differences arose most probably during the 1911-1951 years, thus value added figures could overestimate Southern Italy falling back which took place in that period. Building a consumer price index for the Italian regions must be regarded as a fundamental task in order to improve value added estimates based on workforce and nominal wages, at least with respect to the interwar period (but also later).

### 3. Regional disparities in 1871: hypotheses, problems, results

Table 1 shows different estimates of regional income disparities in 1871, to allow for two alternative hypotheses about per worker productivity of some sectors of the services. More in detail, VA 3 (1) is estimated according to the hypothesis that for each region productivity of commerce, credits, public administration and various services was the average productivity of agriculture, industry and transports-communication, weighted according to the corresponding shares of working force; VA 3 (2) is estimated according to the hypothesis that in 1871 the ratio between transport and communication productivity on one side and productivity of (separately) commerce, credits, public administration and various services on the other, was the same as 1881.

Results from table 1 are problematic: broadly speaking, the first hypothesis – VA 3 (1) – assigns higher per worker productivity disparities (on the average of the three sectors) to Southern Italy than to the North-West, thus reducing the North-South income divide on the passage from VA 2 to VA 3. Conversely, the second hypothesis – VA 3 (2) – assigns higher per worker productivity to the North-West, with an opposite outcome. What is the difference? In the first case, productivity of the services is partially derived from agriculture, whose per worker productivity, according to the new estimates by Giovanni Federico (2000, 2007), was higher in the South up to 1911 (see also table 5). In the second case, productivity of the services is estimated trying to make the best use of what we know about industrial productivity in 1871 and industrial and services productivity in 1881. This second methodology is more consistent with that used for the other benchmark years, thus it should be preferable at least with regard to long-term historical comparisons; of course, problems come with the fact that in the case of 1871 we have fewer historical data and thus we must work with more hypotheses: results are less reliable.

Table 1. *Different estimates of regional income disparities in 1871 (per capita value added, Italy=1)*

	VA 1	VA 2	VA 3 (1)	VA 3 (2)
Piedmont	1.07	1.06	0.95	0.97
Aosta Valley				
Liguria	1.20	1.17	1.34	1.35
Lombardy	1.05	1.07	0.96	1.24
<i>North-West</i>	<i>1.08</i>	<i>1.08</i>	<i>1.00</i>	<i>1.14</i>
Trentino-Alto A.	-	-	-	-
Veneto	0.98	1.00	1.04	0.90
Friuli	-	-	-	-
Emilia	0.98	0.99	1.00	0.91
Tuscany	1.05	1.07	1.05	1.35
The Marches	1.05	1.00	0.83	0.75
Umbria	1.01	0.99	1.06	0.92
Latium	1.21	1.22	1.28	1.59
<i>North-East-C.</i>	<i>1.03</i>	<i>1.03</i>	<i>1.04</i>	<i>1.06</i>
Abruzzi	0.88	0.86	0.84	0.77
Campania	1.08	1.07	1.09	0.99
Apulia	0.91	0.91	0.96	0.83
Lucania	0.87	0.85	0.70	0.62
Calabria	0.81	0.78	0.76	0.65
Sicily	0.88	0.88	1.08	0.92
Sardinia	0.76	0.84	0.87	0.74
<i>South and islands</i>	<i>0.92</i>	<i>0.92</i>	<i>0.97</i>	<i>0.85</i>
Italy (2001 euros)	1,263	1,263	1,263	1,263

Sources and notes: see text and appendix.

With regard to the North-South divide, VA 3 (1) results are in line with recent estimates by Vittorio Daniele and Paolo Malanima (2007), according to which Southern Italy per capita income was

99% of the Italian average in 1871, 100% in 1861. Malanima & Daniele's estimates, however, differ from Esposito's older ones, where in 1871 Southern income was 91% of the Italian average (Esposito 1997): figures, these latter, similar to VA 1 and VA 2 results, which do not allow for regional productivity disparities within the three sectors. These last results look, after all, as the less counterintuitive. If we have to take as good VA 2 figures, we should accept the hypothesis that regional per worker productivities were equal within the sectors, while of course disparities would still be relevant among agriculture, industry and services; in terms of total per worker productivity, what really mattered was the relative share of non-agricultural employment, i.e. the allocation of workforce among agriculture, industry and services. This could be a third and viable hypothesis, as long as we lack more reliable data about productivity.

Estimates of literacy, life expectancy and heights (which approximate nutrition) seem to confirm that, at least as far as social indicators are concerned, there was already a clear North-South divide at the time of Unification (see Felice 2007a, 2007b). Since longevity and nutrition express basic needs which affect more heavily low-income people, a discordance with the ranks in average income, such is the case with VA 3 (1) estimates, can be explained in terms of interclass income disparities, in this case higher in Southern Italy than in the Centre-North. Although we do not have estimates (such as Gini's coefficient) to check for this hypothesis<sup>4</sup>, some hints suggest that it could be true. In the South extensive agricultural production with latifundistas on one side and great masses of day labourers on the other, as compared to the sharecropping or to the intensive production of the Centre-North, as well as larger financial activities than in the Centre-North but which could not find productive investments: these features are typical of an economic system where wealth is highly polarized. But were they strong enough to explain a substantial income parity, in the face of so clear regional disparities in the social indicators? How much richer had to be a handful of aristocrats in the South, in order to counterbalance the larger poverty of the great mass of the population?

Besides 1871, hopefully this paragraph and these questions may be useful to highlight the main problems and controversies which weight over income estimates for other benchmark years, at least until 1911. For example, from table 1 we learn that results do not change so much from VA 1 to VA 2, that is introducing estimates of female and children wages. Conversely, they can change dramatically on the passage from VA 2 to VA 3, mainly because of the different per worker productivities scored by agriculture, industry and services. This outcome can be a good reason to maintain separate productivity estimates of these three sectors, as it has been done. It also involves that, until we have safer estimates about agriculture value added and per worker productivity in industry and services, that is as long as we proceed from the XIX century into the early XX century, data become more reliable.

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<sup>4</sup> The work by Rossi, Toniolo and Vecchi (2001) on the household budgets did not present a regional breakdown.

#### 4. The overall picture: regional disparities in the long run

Table 2 presents regional income trends from 1881 up to 2001, with new estimates for two benchmark years (1881 and 1901). From this long term picture, some basic issues of the debate about regional development in Italy may be briefly rediscussed.

Table 2. *Regional income disparities in Italy, 1871-2001 (per capita value added, Italy=1)*

	1881	1891	1901	1911	1938	1951	1971	1981	1991	2001
Piedmont						1.47	1.21	1.14	1.15	1.15
Aosta Valley	1.17	1.10	1.25	1.18	1.39	1.58	1.35	1.30	1.18	1.24
Liguria	1.27	1.49	1.40	1.53	1.68	1.62	1.16	1.11	1.15	1.09
Lombardy	1.03	1.16	1.23	1.22	1.39	1.53	1.34	1.28	1.30	1.30
<i>North-West</i>	<i>1.11</i>	<i>1.18</i>	<i>1.26</i>	<i>1.24</i>	<i>1.43</i>	<i>1.52</i>	<i>1.28</i>	<i>1.22</i>	<i>1.24</i>	<i>1.24</i>
Trentino-Alto A.	-	-	-	-	0.95	1.06	1.01	1.12	1.10	1.29
Veneto	0.80	0.80	0.90	0.84	0.84	0.98	0.99	1.08	1.12	1.13
Friuli	-	-	-	-	1.19	1.11	1.00	1.09	1.14	1.12
Emilia	0.93	1.08	0.95	1.08	1.04	1.12	1.14	1.29	1.21	1.23
Tuscany	1.07	1.02	0.93	0.96	1.01	1.05	1.05	1.11	1.05	1.09
The Marches	0.83	0.86	0.83	0.81	0.79	0.86	0.91	1.05	0.99	0.99
Umbria	1.06	1.01	0.95	0.88	0.96	0.90	0.93	0.98	0.97	0.96
Latium	1.67	1.52	1.45	1.48	1.19	1.08	1.07	1.05	1.13	1.13
<i>North-East-C.</i>	<i>0.99</i>	<i>1.01</i>	<i>0.97</i>	<i>0.99</i>	<i>0.99</i>	<i>1.04</i>	<i>1.04</i>	<i>1.11</i>	<i>1.11</i>	<i>1.13</i>
Abruzzi	0.79	0.63	0.65	0.67	0.58	0.58	0.80	0.84	0.89	0.84
Campania	0.96	0.97	0.91	0.94	0.82	0.69	0.71	0.67	0.68	0.65
Apulia	1.06	1.00	0.96	0.86	0.72	0.65	0.75	0.72	0.73	0.67
Lucania	0.72	0.69	0.76	0.70	0.57	0.47	0.75	0.68	0.66	0.73
Calabria	0.79	0.64	0.69	0.70	0.49	0.47	0.67	0.65	0.59	0.64
Sicily	1.00	0.93	0.87	0.85	0.72	0.58	0.70	0.71	0.68	0.66
Sardinia	0.86	0.95	0.89	0.90	0.83	0.63	0.85	0.72	0.74	0.76
<i>South and islands</i>	<i>0.93</i>	<i>0.87</i>	<i>0.85</i>	<i>0.84</i>	<i>0.70</i>	<i>0.61</i>	<i>0.73</i>	<i>0.70</i>	<i>0.70</i>	<i>0.68</i>
Italy (2001 euros)	1,369	1,437	1,536	1,841	2,596	2,940	10,027	13,199	16,470	19,928

Source and notes: see appendix.

Not remarkable at the beginning, the North-South income divide increased over the period from 1881 to 1951, although at different rates (see table 3). This finding is more controversial for the 1871-1881 decade, when it can change according to the hypotheses employed on services productivity.

During the 1891-1911 years, the process of divergence slowed down: this was the period of the North-western take-off (1891-1911), but also that of the great mass transoceanic migration, mostly from the Southern regions and probably with positive consequences in terms of per capita income; although correlation is not causation, it should be noticed that there was a positive performance of the poorest regions of the South – Abruzzi, Basilicata and Calabria – which were also those scoring higher transoceanic emigration (Felice 2007a, pp. 46-48).

From 1911 to 1951 – that is during the two world wars, the interwar period with the fascist dictatorship and the reconstruction after world war II – Southern Italy fell back dramatically, while the North-West consolidated its primacy. Conversely, the 1951-1971 economic “miracle” saw convergence of Southern Italy, at quite a speedy rate: during this period a massive regional policy was carried out, through the state agency called Cassa per il Mezzogiorno, and significant interregional migration movements took place, from the Southern to the Northern regions; in Southern Italy both per worker productivity and the share of industrial workforce improved, as never before.

Convergence of Southern Italy came to a halt during the 1970s, mostly because of the oil crises resulting into the collapse of the top-down policy of building basic industry plants, which had been financed through the Cassa. Although at a very slow rate, Southern Italy kept on falling back also in the last two decades of the XX century, characterized by «agonizing» (Cafiero 2000) and highly inefficient regional policies.

Table 3. *Southern regions yearly rate of convergence/divergence (Italy=1), %*

	Abruzzi	Campani a	Apulia	Lucania	Calabria	Sicily	Sardinia	South and is- lands
1871 [VA 2]-1881	-0.85	(-1.08)	1.54	-1.65	0.13	1.29	0.24	0.11
1871 [VA 3(1)]-1881	-0.61	(-1.26)	1.00	0.28	0.39	(-0.77)	-0.12	-0.42
1871 [VA 3(2)]-1881	0.26	-0.31	2.48	1.51	1.97	0.84	1.51	0.90
1881-1891	-2.24	0.10	(-0.58)	-0.42	-2.08	-0.72	1.00	-0.66
1891-1901	0.31	-0.64	-0.41	0.97	0.76	-0.66	-0.65	-0.23
1901-1911	0.30	0.32	-1.09	-0.82	0.14	-0.23	0.11	-0.12
1911-1938	-0.53	-0.50	-0.66	-0.76	-1.31	-0.61	-0.30	-0.67
1938-1951	0.00	-1.32	-0.78	-1.47	-0.32	-1.65	-2.10	-1.05
1951-1971	1.62	0.14	0.72	2.36	1.79	0.94	1.51	0.90
1971-1981	0.49	-0.58	-0.41	-0.98	-0.30	0.14	-1.65	-0.42
1981-1991	0.58	0.15	0.14	-0.30	-0.96	-0.43	0.27	0.00
1991-2001	-0.58	-0.45	-0.85	1.01	0.82	-0.30	0.27	-0.29
<i>1881-2001</i>	<i>0.05</i>	<i>-0.32</i>	<i>-0.38</i>	<i>0.01</i>	<i>-0.18</i>	<i>-0.35</i>	<i>-0.10</i>	<i>-0.26</i>

Legend: minus sign indicates divergence; when in parenthesis, minus means convergence (income is above the Italian average).

Source: elaborations from table 2.

Yet talking of Southern Italy as a whole could be misleading, given its significant internal regional disparities. Indeed, what was already suggested by the 1891 figures (Felice, 2005b), is now confirmed by estimates referring to 1881 and 1871. In the decades soon after Unification there were remarkable income disparities within Southern Italy, with the three biggest regions, Campania, Sicily and Apulia, hovering around the Italian average; by 1891 we register a decline of the leading Southern regions, but also a falling back of the most backward ones, with an increase of the regional disparities index from 1881 to 1891 (see table 4). From the end of the XIX century, a process of convergence took place *within* Southern Italy, so much that in terms of internal diversification this macro-region ended up far below the Italian average during the XX century. Moreover, within Southern Italy internal ranks were bound to change dramatically: by 2001, those very regions which were the most advanced ones in the XIX century, that is Campania, Sicily and Apulia, had become the most economically backward, together with Calabria; while two of the three historically poorest, Abruzzi (with Molise) and Lucania, had taken the lead. At least during the last three decades, it could be easily noticed the strong negative correlation between economic performance and the pervasiveness of organized crime.

Table 4. *Weighted index of total regional disparities*

	North-West	North-East-Centre	South and islands	Italy
1871 [VA 2]-1881	0.021	0.048	0.088	0.081
1871 [VA 3(1)]-1881	0.079	0.053	0.124	0.091
1871 [VA 3(2)]-1881	0.124	0.221	0.128	0.177
1881	0.073	0.173	0.098	0.124
1891	0.066	0.143	0.145	0.146

1901	0.029	0.123	0.098	0.177
1911	0.056	0.148	0.087	0.181
1938	0.048	0.114	0.125	0.256
1951	0.023	0.061	0.098	0.269
1971	0.055	0.052	0.052	0.208
1981	0.059	0.058	0.047	0.206
1991	0.058	0.046	0.066	0.214
2001	0.062	0.043	0.058	0.227

Source: elaborations from table 2.

Notes: the index formula is taken from Carreras (1990): for each benchmark year, absolute differentials between a region and the national/macro-regional average (=1) are weighted with the regional share of population, then summed. The rationale behind this formula is the same as in the case of the variance or the standard deviation, choice is just a matter of elegance. These results look more robust than those derived from other measures of regional disparities, such as those by Williamson (1965) or Theil (1967), although macro-regional ranks are almost the same. Williamson's and Theil's estimates have not been reported for reasons of space, but they are available on request. For a discussion about these indicators, see Shankar and Shah (2003).

By the second half of the XIX century also the Nec (North-Easte-Centre) looks as a very diversified macro-region, in many regards comparable to the South. Conversely, the North-West remained the most homogeneous Italian macro-region until the second half of the XX century, when the decline of Liguria began. Indeed, during the North-West economic rise, from 1881 to 1901 and later from 1911 to 1951, regional disparities within this macro-region decreased, whereas they increased in coincidence with its relative decline, which took place mostly from 1951 to 1971.

Within the Nec, the rise of the so-called «third Italy» (Trentino, Veneto, Friuli, Emilia, Tuscany, the Marches) seems to have begun already in the 1938-1951 years, although it manifested more clearly from the 1970s onwards: mostly it was a catching-up of the less developed regions (Veneto, the Marches, Umbria), which involved a decrease of the regional disparities index within this area.

Finally, from table 4 it must be noticed that over time all of the three macro-regional indices of regional disparities have fallen remarkably below the national index: while within the three areas regions tended to become more similar, within Italy as a whole regional disparities increased. For this reason, macro-regional categories are a construct *a posteriori*, at least in economic terms.

## 5. Productivity trends

Per capita Gdp is the product of two different measures, per worker productivity and the share of active population, as from the equation:

$$[2] Y/P = Y/L * L/P,$$

where Y is income, P is population and L is labor.

Trends in per worker productivity are shown in tables 5 and 6, as a total (table 5) and separately for the three sectors, agriculture, industry and services (table 6).

Southern Italy scored lower per worker productivity than the North-West already by 1881, but later it lived through a decrease which lasted up to 1951, with the exception of the 1891-1911 interval; conversely, its position improved during the years of convergence, 1951-1971, as well as in the following period at a slower rate. North Western regions took the lead in per worker productivity as late as 1891; they improved up to 1951, later they lost some ground but managed to keep their primacy. By 1871 and 1881, in terms of per worker productivity the Nec regions were comparable to the North-West, yet in the following decades their position worsened, remaining around the Italian average; during the XX century, the Nec experienced two periods of relative productivity rise, the 1938-1951 and the 1971-2001 years, those very ones of its income catching-up. Within the three macro-regions, as usual regional paths look very diversified. Striking disparities were present within the Southern regions, but also in the North-West, firmly led by Liguria from 1871 to 1951, as well as in the Nec, where Latium, Tuscany and from 1951 Emilia scored the highest values.

Table 5. *Per worker productivity, 1871-2001 (Italy=1)*

	1871 (VA 2)	1871 (VA 3-1)	1871 (VA 3-2)	1881	1891	1901	1911	1938	1951	1971	2001
Piedmont	1.024	0.918	0.937	1.085	0.995	1.101	1.001	1.140	1.234	1.051	1.019
Aosta Valley									1.117	1.021	1.017
Liguria	1.155	1.323	1.333	1.296	1.501	1.394	1.501	1.609	1.660	1.151	1.107
Lombardy	1.007	0.903	1.167	0.940	1.064	1.143	1.134	1.260	1.367	1.165	1.099
<i>North-West</i>	<i>1.033</i>	<i>0.956</i>	<i>1.090</i>	<i>1.033</i>	<i>1.089</i>	<i>1.156</i>	<i>1.121</i>	<i>1.262</i>	<i>1.352</i>	<i>1.129</i>	<i>1.081</i>
Trentino-Alto A.	-	-	-	-	-	-	-	0.868	1.002	0.894	1.078
Veneto	1.065	1.108	0.958	0.868	0.840	0.908	0.864	0.843	0.961	0.964	0.963
Friuli	-	-	-	-	-	-	-	1.122	1.059	0.932	0.982
Emilia	0.987	0.997	0.907	0.971	1.091	0.927	1.052	0.957	1.083	1.038	1.033
Tuscany	1.095	1.075	1.382	1.346	1.063	1.055	0.947	0.982	1.005	1.000	0.997
The Marches	0.880	0.730	0.660	0.777	0.800	0.771	0.773	0.716	0.798	0.848	0.883
Umbria	0.903	0.967	0.839	0.698	1.027	0.715	0.890	0.917	0.881	0.947	0.936
Latium	1.179	1.237	1.536	1.668	1.545	1.486	1.535	1.213	1.087	1.099	1.143
<i>North-East-C.</i>	<i>1.030</i>	<i>1.040</i>	<i>1.060</i>	<i>1.033</i>	<i>1.032</i>	<i>0.967</i>	<i>0.989</i>	<i>0.957</i>	<i>1.010</i>	<i>0.999</i>	<i>1.018</i>
Abruzzi	0.844	0.824	0.756	0.756	0.597	0.616	0.664	0.584	0.589	0.847	0.866
Campania	1.032	1.051	0.955	0.956	0.985	0.930	0.962	0.938	0.826	0.894	0.915
Apulia	0.928	0.979	0.846	1.076	1.058	1.062	0.937	0.845	0.707	0.809	0.831
Lucania	0.868	0.715	0.633	0.693	0.650	0.714	0.680	0.571	0.421	0.825	0.824
Calabria	0.717	0.699	0.597	0.691	0.569	0.630	0.670	0.540	0.466	0.774	0.851
Sicily	1.011	1.241	1.057	1.099	1.085	1.067	1.046	0.916	0.738	0.867	0.921
Sardinia	1.200	1.243	1.057	1.118	1.201	1.089	1.107	0.976	0.705	0.982	0.863
<i>South and islands</i>	<i>0.950</i>	<i>1.002</i>	<i>0.878</i>	<i>0.944</i>	<i>0.907</i>	<i>0.908</i>	<i>0.909</i>	<i>0.808</i>	<i>0.688</i>	<i>0.858</i>	<i>0.880</i>

Sources: see appendix.

As far as agriculture is concerned, the leadership of Southern Italy in per worker productivity lasted through all the liberal age, from Unification until world war I (table 6, see also Felice 2007a, p. 132), at least according to Federico estimates of gross saleable production. However, in terms of *per hour* productivity a more recent work by Federico postulates a substantial parity between North and South already by 1911 (Federico 2007). Moreover, it should be reminded that, in order to properly evaluate agriculture efficiency, it must be employed total factor productivity, including capital

and land together with labor. Yet TFP estimates are difficult to produce for the periods previous to world war II (see *ibidem* for the last attempts), indeed also out of the scope of this paper. It aims, more simply, to estimate the contribution of the sector to per capita income: what matters is the ratio between production and workers, or that between production and population. This means that a territory with low per hectare yields but which is scarcely populated can manage to feed its inhabitants as well – if not better – as a territory with higher per hectare yields but more densely populated; this could have been the case of Sardinia, for example, compared to Lombardy (for data on per hectare productivity confirming this comparison, see Felice 2007a, p. 133). On average the Centre-North, however, scored higher *per hectare* productivity than the South already by 1911 (*ibidem*), as well as higher total factor productivity – although not yet in 1891, according to Federico’s estimates (Federico 2007). This advantage resulted into higher returns of land investments and thus had positive consequences on capital accumulation: in this sense it can help to explain per worker productivity trends, that is the spectacular rise of the Northern regions during the first half of the XX century. In the North-West, this improvement should be regarded as one of the main causes behind its productivity (and income) rise in the 1911-1951 years, along with industrial growth.

Table 6. *Per worker productivity in agriculture, industry and services, 1871-2001 (Italy=1)*

	1871				1911			1951			2001		
	Agr.	Ind.	Serv. VA 3-1	Serv. VA 3-2	Agr.	Ind.	Serv.	Agr.	Ind.	Serv.	Agr.	Ind.	Serv.
Piedmont	0.583	1.859	0.964	1.013	0.861	1.165	1.077	1.351	1.159	1.032	1.135	1.032	1.025
Aosta Valley									1.756	0.975	0.477	0.947	1.032
Liguria	1.024	1.210	1.158	1.188	1.049	1.484	1.234	1.523	1.559	1.455	1.158	1.127	1.061
Lombardy	0.734	1.277	0.955	1.828	0.912	1.134	1.206	1.532	1.177	1.110	1.809	1.093	1.093
<i>North-West</i>	<i>0.698</i>	<i>1.468</i>	<i>0.993</i>	<i>1.414</i>	<i>0.901</i>	<i>1.184</i>	<i>1.168</i>	<i>1.468</i>	<i>1.207</i>	<i>1.146</i>	<i>1.434</i>	<i>1.077</i>	<i>1.071</i>
Trentino-Alto A.	-	-	-	-	-	-	-	1.133	1.110	1.048	0.852	1.164	1.077
Veneto	1.023	1.171	1.069	0.633	0.879	0.977	0.874	1.036	1.022	0.992	1.239	0.932	0.998
Friuli	-	-	-	-	-	-	-	0.865	1.025	1.178	1.422	0.952	0.975
Emilia	1.179	0.564	0.967	0.714	1.243	1.045	0.910	1.116	0.985	1.023	1.237	1.105	1.008
Tuscany	0.979	0.980	1.033	1.743	0.934	0.882	0.989	1.033	0.932	1.004	0.878	0.984	1.004
The Marches	0.828	0.577	0.804	0.530	0.914	0.781	0.779	0.983	0.613	0.804	1.191	0.783	0.955
Umbria	1.117	0.695	1.017	0.477	1.073	0.990	0.838	1.053	0.972	0.794	1.107	0.926	0.929
Latium	1.038	1.131	1.063	1.618	1.499	1.316	1.239	1.020	0.910	1.023	0.861	1.181	1.085
<i>North-East-C.</i>	<i>1.032</i>	<i>0.923</i>	<i>1.013</i>	<i>1.068</i>	<i>1.043</i>	<i>0.984</i>	<i>0.966</i>	<i>1.045</i>	<i>0.952</i>	<i>1.006</i>	<i>1.089</i>	<i>1.007</i>	<i>1.021</i>
Abruzzi	1.064	0.266	0.891	0.490	0.749	0.739	0.926	0.708	0.653	0.757	0.974	0.876	0.872
Campania	1.018	0.929	1.037	0.831	0.831	0.900	1.004	0.737	0.743	0.908	0.838	0.902	0.915
Apulia	1.147	0.693	1.070	0.625	1.103	0.729	0.955	0.827	0.724	0.940	0.719	0.773	0.882
Lucania	0.919	0.246	0.809	0.419	0.793	0.723	0.863	0.570	0.331	0.626	0.803	0.757	0.908
Calabria	1.206	0.294	0.810	0.384	0.830	0.486	0.784	0.651	0.374	0.613	0.833	0.818	0.865
Sicily	1.870	0.531	1.008	0.614	1.398	0.764	0.774	0.969	0.548	0.847	0.761	0.899	0.935
Sardinia	1.394	0.618	0.987	0.553	1.620	0.819	0.714	0.983	0.813	0.686	0.887	0.861	0.866
<i>South and islands</i>	<i>1.230</i>	<i>0.631</i>	<i>0.992</i>	<i>0.653</i>	<i>1.026</i>	<i>0.766</i>	<i>0.882</i>	<i>0.794</i>	<i>0.635</i>	<i>0.834</i>	<i>0.801</i>	<i>0.853</i>	<i>0.900</i>

Sources: see appendix. For further data (on 1891 and 1971) see Felice 2007a, p. 132.

Unlike agriculture, in industry the North-South divide in per worker productivity was remarkably high already by 1871. This gap was partly fulfilled during the 1871-1911 period, whereas it increased slightly in the interwar years. But these were the ages when the economic lead of the North-West was established and consolidated, also in terms of per worker total productivity; thus total productivity primacy was due more to the enlarging share of the industrial and services working force (see table 7 in the next paragraph), less to a productivity rise of the industrial workers. At the beginning at least, it was industrialization that mattered, following the well-known and long established arguments by Simon Kuznets (1966) and Edward Denison (1967).

It should be noticed that, by 1871, in industry productivity disparities were remarkably high through all of Italy, within the Nec and the North-West but, even more, within Southern Italy. Convergence which took place was not only between North and South, but also within the three macro-regions.

In the second half of the XX century the North-South gap was partially closed, also for what regards industrial productivity. The productivity improvement of Southern Italy was partly due to the top-down strategy of industrialization, which favoured sectors with a higher capital/labor ratio, but it came to a halt in the last decades, when as a consequence of the oil shocks the heavy industries of the South faced severe slumps, while public incentives were directed towards less capital-intensive activities.

From Unification until world war II, services productivity disparities were roughly in between those in agriculture and industry, probably closer to the latter. By 1951, services had become the sector where the North-South productivity divide was less pronounced. To produce this change the expansion of the public sector played a major role: here wages were more or less equal among the Italian regions, independently from consumer prices as well as (in part) from economic conditions. The public sector had a counterbalancing impact on regional productivity disparities.

## 6. Workforce allocation and active population

Total per worker productivity depends not only on the productivities of each of the three sectors, agriculture, industry and services, but also on the allocation of the working force between sectors with lower (usually agriculture) or higher productivity (industry and even more services), which determines the relative weights.

Table 7 presents the shares of regional agricultural employment compared to the Italian average: in terms of workforce allocation, at least at the times of Unification regional disparities within Italy did not have the direction one would have expected. As we can see, by 1871 on the whole Southern Italy was the macro-region with the lowest share of agricultural employment (that is with the highest share of industry and services), a result which would be consistent with the finding of higher per worker productivity for this sector. More in particular three Southern regions, Campania, Calabria and Sicily, were those with the lowest agricultural share in all of Italy, although we should remind that in some of these cases productivity of “industry” (more properly handicrafts) and services was remarkably lower than in the rest of the country.

Southern primacy was lost in the following three decades. Calabria ended above the national average already by 1901, Sicily and Campania later, by 1938 and 1951 respectively. Moreover, it is worth stressing that on the whole the Italian share of agricultural employment remained stable through all the period from 1871 to 1911: during those years industrialization was a process confined to the North-western regions, in Southern Italy it did not take place at all and indeed some areas lived through de-industrialization. From 1938 also the Nec regions improved, while Southern Italy kept on worsening in relative terms: some of its former leading regions would have become those with the highest share of agricultural workers.

Table 7. Agricultural employment as a share of the total employment (Italy=1)

	1871	1881	1891	1901	1911	1938	1951	1971	2001
Piedmont	1.162	1.141	1.090	1.036	0.999	0.886	0.781	0.732	0.709
Aosta Valley							1.233	1.198	1.092
Liguria	0.952	0.872	0.787	0.709	0.633	0.527	0.579	0.569	0.676
Lombardy	1.007	0.958	0.899	0.848	0.782	0.594	0.521	0.336	0.362
<i>North-West</i>	<i>1.062</i>	<i>1.023</i>	<i>0.963</i>	<i>0.907</i>	<i>0.849</i>	<i>0.688</i>	<i>0.619</i>	<i>0.488</i>	<i>0.493</i>
Trentino-Alto A.	-	-	-	-	-	1.045	1.106	1.043	1.593
Veneto	1.083	1.102	1.087	1.058	1.102	1.103	1.091	0.904	0.813
Friuli	-	-	-	-	-	0.789	0.875	0.770	0.622
Emilia	1.001	1.035	1.054	1.066	1.052	1.220	1.071	0.990	1.086
Tuscany	0.977	1.149	0.973	1.143	0.918	0.988	0.920	0.690	0.745
The Marches	1.145	1.147	1.166	1.187	1.217	1.385	1.254	1.417	0.765
Umbria	1.211	0.809	1.257	0.798	1.255	1.344	1.249	1.243	0.907
Latium	0.945	0.933	0.914	0.884	0.810	0.866	0.737	0.530	0.701
<i>North-East-C.</i>	<i>1.042</i>	<i>1.056</i>	<i>1.055</i>	<i>1.047</i>	<i>1.038</i>	<i>1.083</i>	<i>0.998</i>	<i>0.850</i>	<i>0.859</i>
Abruzzi	1.230	1.190	1.242	1.303	1.393	1.548	1.556	1.927	1.314
Campania	0.883	0.861	0.901	0.927	0.964	1.000	1.046	1.358	1.321
Apulia	0.990	0.964	1.023	1.086	1.137	1.102	1.452	2.113	2.261
Lucania	1.120	1.195	1.244	1.312	1.384	1.566	1.689	2.294	2.080
Calabria	0.788	0.844	0.938	1.053	1.216	1.408	1.490	2.052	2.319
Sicily	0.719	0.845	0.865	0.897	0.952	1.062	1.266	1.604	1.840
Sardinia	1.085	1.047	1.048	1.048	1.065	1.174	1.268	1.430	1.635
<i>South and islands</i>	<i>0.915</i>	<i>0.936</i>	<i>0.981</i>	<i>1.030</i>	<i>1.091</i>	<i>1.181</i>	<i>1.328</i>	<i>1.734</i>	<i>1.775</i>
Italy (total)	57.6	55.7	57.9	59.4	55.4	48.0	44.6	18.9	5.2

Along with per worker productivity, the second determinant of per capita income is the share of active population, that is the ratio total employment / total population. Unlike productivity, in this case absolute figures went declining over time, as shown in the last row of table 8, due to demo-

graphical and social forces (ageing of population, spread of mass education, social security systems) which could more than offset changes in the opposite direction (the rise of female employment).

By 1871, Southern Italy had already the lowest share of active population, but this gap went increasing through all the 1871-2001 period, at a speedier rate in the second half of the XX century and, in particular, during the last decades (1971-2001). Since in those very decades there was indeed a slight convergence of Southern productivity (see again table 5), we can deduce that the income falling back of those years was due to unemployment problems, rather than to productivity. What is just a suggestion can be better quantified, by estimating the exact contribution of the two components (per worker productivity and active population) to the convergence/divergence regional paths. This will be the subject of the next paragraph.

Table 8. Total workforce as a share of the current population (Italy=1)

	1871	1881	1891	1901	1911	1938	1951	1971	2001
Piedmont	1.035	1.078	1.105	1.135	1.179	1.219	1.191	1.151	1.129
Aosta Valley							1.415	1.322	1.219
Liguria	1.013	0.980	0.993	1.004	1.019	1.044	0.976	1.008	0.985
Lombardy	1.063	1.096	1.090	1.076	1.076	1.103	1.119	1.150	1.183
<i>North-West</i>	<i>1.046</i>	<i>1.075</i>	<i>1.084</i>	<i>1.090</i>	<i>1.106</i>	<i>1.133</i>	<i>1.124</i>	<i>1.134</i>	<i>1.147</i>
Trentino-Alto A.	-	-	-	-	-	1.094	1.058	1.130	1.197
Veneto	0.939	0.922	0.952	0.991	0.972	0.997	1.020	1.027	1.174
Friuli	-	-	-	-	-	1.061	1.048	1.073	1.140
Emilia	1.003	0.958	0.990	1.025	1.027	1.087	1.034	1.098	1.191
Tuscany	0.977	0.795	0.960	0.834	1.014	1.028	1.045	1.050	1.093
The Marches	1.137	1.068	1.075	1.077	1.048	1.103	1.078	1.073	1.121
Umbria	1.096	1.519	0.983	1.553	0.989	1.047	1.021	0.982	1.026
Latium	1.035	1.001	0.984	0.976	0.964	0.981	0.994	0.974	0.989
<i>North-East-C.</i>	<i>1.000</i>	<i>0.958</i>	<i>0.979</i>	<i>1.003</i>	<i>1.001</i>	<i>1.035</i>	<i>1.030</i>	<i>1.041</i>	<i>1.110</i>
Abruzzi	1.019	1.045	1.055	1.055	1.009	0.993	0.984	0.944	0.970
Campania	1.037	1.004	0.985	0.979	0.977	0.874	0.835	0.794	0.710
Apulia	0.981	0.985	0.945	0.904	0.918	0.852	0.919	0.927	0.806
Lucania	0.979	1.039	1.061	1.065	1.029	0.998	1.116	0.909	0.886
Calabria	1.088	1.143	1.124	1.096	1.044	0.907	1.009	0.866	0.752
Sicily	0.870	0.910	0.857	0.815	0.813	0.786	0.786	0.807	0.717
Sardinia	0.700	0.769	0.791	0.817	0.813	0.850	0.894	0.866	0.881
<i>South and islands</i>	<i>0.968</i>	<i>0.985</i>	<i>0.959</i>	<i>0.936</i>	<i>0.924</i>	<i>0.866</i>	<i>0.886</i>	<i>0.851</i>	<i>0.773</i>
Italy (total)	56.4	54.2	51.7	50.1	47.3	43.4	42.1	36.9	36.8

Note: for 1911, 1938 and 1951 workforce according to Vitali (1970).

## 7. Productivity contribution to income trends

From equation [2]  $Y/P = Y/L * L/P$ , where  $Y/P$  is per capita income,  $Y/L$  per worker productivity and  $L/P$  active population, we have, for every region and benchmark year

$$[3] \Delta(Y/P) = \Delta(Y/L) * \Delta(L/P)$$

where  $\Delta$  stays for the ratio between the regional value and the national average. For every sub-period, we calculate the ratio between the final ( $t_1$ ) and the initial value ( $t_0$ ), as

$$[4] \Delta(Y/P)_{t_1}/\Delta(Y/P)_{t_0} = [\Delta(Y/L)_{t_1}/\Delta(Y/L)_{t_0}] * [\Delta(L/P)_{t_1}/\Delta(L/P)_{t_0}]$$

then we call  $\Delta(Y/P)_{t_1}/\Delta(Y/P)_{t_0}$ ,  $\Delta(Y/L)_{t_1}/\Delta(Y/L)_{t_0}$  and  $\Delta(L/P)_{t_1}/\Delta(L/P)_{t_0}$ :  $Y/P_c$ ,  $Y/L_c$  and  $L/P_c$  respectively, where  $c$  stays for change. The logarithmic form of [4] is

$$[5] \ln(Y/P_c) = \ln(Y/L_c) + \ln(L/P_c)$$

from which, after expressing log results in absolute values, we can estimate the contribution of per worker productivity to income change, as

$$[6] \text{contribution of } Y/L_c \text{ to } Y/P_c = \text{absolute } \ln(Y/L_c) / [\text{absolute } \ln(Y/L_c) + \text{absolute } \ln(L/P_c)]$$

from equation [6] the figures of table 9 are derived.

During the 1871-1891 years, productivity had probably a major part in Southern Italy economic performance. Conversely, in the following two decades almost all of the falling back of Southern Italy was due to active population, whereas in terms of productivity Southern Italy managed to keep pace with the North-West. Yet the critical period for Southern Italy performance were the 1911-1951 years, when productivity disparities played once again the major role. Productivity counted also for much of the convergence of Southern Italy during the Italian miracle (1951-1971).

Compared with Southern Italy, that of the Nec was a different story: while having a minor role in the first two decades after Unification, productivity was more important in the 1891-1911 years; on the contrary, in the second half of the XX century on the whole it counted less than active population. In the long run (1881-2001), the economic rise of the Nec over the Italian average was not due to per worker productivity, which indeed seems to have been a counter-acting force, although less important than the enlarging share of active population. Unlike the Nec, much of the North-western economic rise from 1881 to 1951 is attributable to per worker productivity, which also had the largest part in the subsequent North-western falling back, during the second half of the XX century.

There is a great variety of cases, through regions and historical periods, so much that it is difficult to balance on the whole the contributions of active population and productivity to the Italian regional development. In the long run (1881-2001) we could say that the former was more important, at least for what concerns two of the three Italian macro-regions; but this is not always true if we look separately at the regional paths, or to shorter interval years. The period when active population was more important is the last one (1971-2001), that of partial de-industrialization. On the contrary (and with some exceptions) during the central years, those of industrialization, per worker productivity looks as the driving force behind income growth, as expected. Whether it was more due to intra-sector productivity rise, or to the reallocation of the working force from agriculture to industry and services, it is still another matter.

Table 9. Percentage of income increase/decrease (on the Italian average) due to productivity

	1871- 1881 (VA 2)	1871- 1881 (VA3-1)	1871- 1881 (VA3-2)	1881- 1891	1891- 1901	1901- 1911	1911- 1938	1938- 1951	1951- 1971	1971- 2001	1881- 2001
Piedmont	58.6	80.2	78.2	77.6	79.2	71.5	79.4	83.1	82.5	60.8	53.8
Aosta Valley									57.1	4.6	
Liguria	77.7	38.4	82.5	91.9	86.0	83.3	74.3	+31.4	92.0	62.6	97.0
Lombardy	69.0	57.1	87.5	96.1	84.6	99.9	80.8	84.9	85.6	67.6	67.1
<i>North-West</i>	0.0	74.2	66.5	86.3	91.0	67.2	83.1	89.6	95.8	78.4	41.0
Trentino-Alto A.	-	-	-	-	-	-	-	80.9	63.3	76.5	70.8*
Veneto	91.7	93.0	83.8	-50.0	66.1	72.0	-50.0	85.0	30.7	-0.7	30.1
Friuli	-	-	-	-	-	-	-	83.0	84.7	46.1	64.6*
Emilia	26.1	36.4	59.7	77.9	82.3	98.6	62.4	71.2	-41.1	-5.8	22.1
Tuscany	50.0	52.2	59.3	55.7	5.1	-35.6	71.5	59.6	-50.0	-6.9	-48.5
The Marches	66.8	50.0	72.5	82.2	97.4	+10.0	59.6	81.9	93.8	48.0	72.5
Umbria	-44.2	-50.0	-47.4	+27.5	-44.2	+32.7	34.3	62.1	64.9	-21.6	+42.7
Latium	91.3	90.1	92.0	81.4	82.6	73.0	93.3	89.4	+35.2	72.0	96.7
<i>North-East-C.</i>	+6.6	13.7	26.1	4.6	72.2	91.8	-50.0	91.5	-50.0	22.7	-9.3
Abruzzi	81.4	77.5	3.8	95.9	96.9	62.5	89.0	50.0	89.6	45.5	64.7
Campania	70.5	74.6	+58.0	59.9	90.0	97.1	18.5	73.7	60.8	+17.1	11.3
Apulia	97.0	95.3	98.3	29.0	+7.8	89.3	58.2	70.1	94.2	+16.2	56.3
Lucania	79.2	-34.3	60.6	75.3	97.2	59.3	85.0	73.1	97.0	4.5	52.1
Calabria	-42.7	-19.3	80.9	92.3	79.0	56.7	60.5	58.2	76.8	+26.2	+33.2
Sicily	65.3	73.0	80.1	17.7	25.1	85.5	80.0	99.9	85.7	+33.5	42.6
Sardinia	-42.9	53.0	73.3	72.0	74.8	76.6	50.1	86.7	91.2	88.4	65.7
<i>South and islands</i>	-25.9	76.8	80.6	60.0	3.9	+7.2	64.6	87.5	84.3	+20.6	22.4

Legend: income decrease in *italics*; minus or plus signs indicate a contribution in the opposite direction of the income trend.

Notes: \* 1938-2001.

Sources: see text.

## 8. Concluding remarks

New estimates of regional income confirm the hypothesis that, in the first decades after Unification, North-South Italian divide was relatively modest; although within Southern Italy regional disparities were higher than elsewhere, on average Southern Italy scored a level of per capita income not far below the rest of the country. According to the available data, per worker agriculture productivity played a big part in this result, whereas in the industrial sector a clear gap in favour of the North was already present.

North-South divide took shape mostly during the 1911-1951 years, with productivity disparities being the major determinant. Southern Italy convergence in the 1951-1971 years was due to productivity as well; on the contrary, its falling back during the last decades (1971-2001) must be attributed to the growing share of unemployed people. The story of the North-East-Centre – a macro-region which also showed a great variety of cases within it – was different: during all the second half of the XX century the increase in the share of active population played the biggest part for its economic rise, although some improvement in industrial productivity did take place too.

The reliability of the new estimates – which refer to 1871, 1881 and 1901 – can be questioned. It is argued, however, that these figures should be regarded as the best possible given the available data and information; when new sources will be available, results could be improved. Problems arise in particular for 1871, where three estimates have been produced, according to different hypotheses about per worker productivity, but none of these seems satisfactory: further research is needed at least for this year, in particular with regard to the agricultural sector. Another useful task should be that of building a consumer price index for the Italian regions: disparities were probably of some importance in 1938 and 1951, thus entailing an overestimate of the North-South divide for that period.

## Appendix. Sources and methodological issues

*General notes:* all estimates are at the borders of the time; all interpolations are calculated through the continuous compounding yearly rate; per capita data are based on the current population.

Table A.1. *Sources of national value-added and regional employment*

	National value-added	Regional employment
1871	Agriculture: Federico (2003b), Fenoaltea (2005) Industry: Fenoaltea (2003a) Services: Fenoaltea (2005)	<a href="#">Census of Population 1871, Maic (1876)</a>
1881	Agriculture: Federico (2003b), Fenoaltea (2005) Industry: Fenoaltea (2003a) Services: Fenoaltea (2005)	<a href="#">Census of Population 1881, Maic (1884)</a>
1891	Agriculture: Federico (2000) Industry: Fenoaltea and Bardini (2000) Services: Zamagni and Battilani (2000)	Interpolation between CP 1881 and CP 1901 data. For textiles Ellena's 1876 data (Ellena 1880) instead of CP 1881, for further details see Felice (2005b)
1901	Agriculture: Federico (2003b), Fenoaltea (2005) Industry: Fenoaltea (2003a) Services: Fenoaltea (2005)	Census of Population 1901, Maic (1904)
1911	Agriculture: Federico (1992; 2000) Industry: Fenoaltea (1992); Fenoaltea and Bardini (2000) Services: Zamagni (1992), Zamagni and Battilani (2000)	Census of Population 1911, Maic (1915). For industry also Industrial Census 1911, Maic (1914a). Industrial underemployment is approximated through the difference between CP and CI data, see Felice (2005b)
1938	Agriculture: Federico (2000) Industry: Fenoaltea and Bardini (2000) Services: Zamagni and Battilani (2000)	Census of Industry and Commerce 1938, Istat (1938-50) Census of Population 1936, Istat (1939a). Industrial underemployment is approximated through the difference between CP and CI data, see Felice (2005a)
1951	Agriculture: Federico (2000) Industry: Fenoaltea and Bardini (2000) Services: Zamagni and Battilani (2000)	Census of Industry and Commerce 1951, Istat (1955-58) Census of Population 1951, Istat (1957). Industrial underemployment is approximated through the difference between CP and CI data, see Felice (2005a)

Table A.2. Sub-sector breakdown of VA 1 and VA 2 estimates

1871	<p><i>Industry:</i> 1) mining, 2) foods, beverage and tobacco, 3) textile, 4) clothing, 5) leather, 6) wood, 7) metallurgy, 8) mechanics, 9) no-iron minerals, 10) chemistry, 11) paper, 12) various manufacturing, 13) construction, 14) utilities.</p> <p><i>Services:</i> 1) railways, tramways and communications, 2) other internal transports, 3) sea transports, 4) commerce, 5) credits and insurance, 6) various services, 7) housing, 8) public administration.</p>
1881	<p><i>Industry:</i> 1) mining, 2) foods and beverage, 3) tobacco, 4) textile, 5) clothing, 6) leather, 7) wood, 8) metallurgy, 9) mechanics, 10) no-iron minerals, 11) chemistry, 12) paper, 13) various manufacturing, 14) construction, 15) utilities.</p> <p><i>Services:</i> 1) railways and tramways, 2) communications, 3) other internal transports, 4) sea transports, 5) commerce, 6) credits and insurance, 7) various services, 8) housing, 9) public administration.</p>
1891	<p><i>Industry:</i> 1) mining, metallic minerals, 2) mining, building materials, 3) other mining, 4) wheat, corn, rice and other flours, 5) bread, 6) pasta, 7) biscuits, pastry, candies 8) dairy and milk products, 9) meat and sausages, 10) seafood, 11) tomato preserves, pickles, dry and syrupy fruits, marmalades, vinegar, 12) chocolate and coffee, 13) sugar, 14) beer and gassy waters, 15) tobacco, 16) other foods and beverage, 17) silk cocoons and carding 18) silk throwing, spinning and weaving, 19) silk dyeing, 20) cotton spinning, 21) cotton weaving, 22) wool spinning, 23) wool weaving, 24) other wool manufacturing, 25) flax hackling and tow, 26) flax spinning, 27) linen weaving, 28) hemp hackling and tow, 29) hemp spinning, 30) hemp weaving, 31) jute hackling, tow and spinning, 32) jute weaving, 33) artificial silk spinning, 34) artificial silk weaving, 35) clothing: felt, straw, felt and straw hats, 36) other clothing, 37) metallurgy and mechanics, 38) silver and gold, 39) chemical fertilizers, 40) pharmaceutical products, 41) explosives, 42) paints and colours, 43) other chemistry, 44) pulp, paper and cardboard, 45) paper industry, 46) printing, 47) photography and cinema, 48) leather, 49) wood, 50) clay, pottery and bricks, 51) glass industry, 52) other no-metallic minerals manufacturing, 53) construction, 54) utilities.</p> <p><i>Services:</i> 1) foods and beverage retail, 2) other retail, 3) foods and beverage wholesale, 4) other wholesale, 5) peddlers, 6) pharmacists, 7) hotels and restaurants, 8) trade agents, 9) railways and tramways, 10) mule drivers, 11) carters, 12) charioteers, 13) land transport entrepreneurs, 14) porters and carriers, 15) other horse transports, 16) sea, lake and fluvial transports, 17) mail service and telegraphs, 18) telephones, 19) banks, 20) insurance services, 21) other financial services, 22) police services, 23) funeral services, 24) laundry services, 25) other cleaning services, 26) hairdressers, 27) shoeshine 28) baths, 29) chiropodists and masseurs, 30) other personal care services, 31) public exhibitions, 32) other show-business services, 33) gymnastic teachers, 34) cantors and members of a choir, 35) dancers and mimes, 36) play and drama artists, 37) other variety artists, 38) stage whispers and bouncers, 39) acrobats, conjurers and puppeteers, 40) musicians, 41) doctors and surgeons, 42) veterinarians, 43) dentists, 44) obstetricians, 45) nurses, 46) other health services, 47) charity employees, 48) private teachers, 49) music teachers, 50) lawyers and notaries, 51) engineers and architects, 52) surveyors, 53) paymasters, 54) painters, 55) designers, 56) models, 57) composers and music directors, 58) writers, translators and interpreters, 59) private employees, 60) secular clergy, 61) monks, friars and nuns, 62) priests of other cults, 63) clerical and church employees, 64) employees of no-Christian cults, 65) private investigators, 66) other private employees, 67) typing activities, 68) household services, 69) department of War, 70) department of Education, 71) department of Navy, 72) all the other departments, 73) local administration, 74) housing.</p>
1901	<p><i>Industry:</i> 1) mining, 2) foods and beverage, 3) tobacco, 4) textile, 5) clothing, 6) leather, 7) wood, 8) metallurgy and mechanics, 9) no-iron minerals, 10) chemistry, 11) paper, 12) various manufacturing, 13) construction, 14) utilities</p> <p><i>Services:</i> the same as 1881</p>
1911	<p><i>Industry:</i> 1) mining, metallic minerals, 2) sulphur mining, 3) fossil fuels, 4) salt mines, 5) mining, building materials, 6) mining, furnace materials, 7) mining, boric acid and graphite, 8) sea salt mining, 9) peat mining, 10) mineral water, 11) wheat and corn flour, 12) rice and other flours, 13) bread, 14) pasta, 15) biscuits and pastry, 16) dairy and milk products, 17) meat and sausages, 18) seafood, 19) tomato preserves, 20) pickles, dry and syrupy fruits, 21) marmalades, candies, sweets and chocolate, 22) coffee, 23) sugar, 24) amid, 25) honey, 26) seed oils, 27) wines, 28) alcohol, 29) beer, vinegar and malt, 30) gassy waters and ice, 31) tobacco, 32) silk cocoons and carding 33) silk throwing, spinning and weaving, 34) silk dyeing, 35) cotton spinning, 36) cotton weaving, 37) wool spinning, 38) wool weaving, 39) other wool manufacturing, 40) flax hackling and tow, 41) flax spinning, 42) linen weaving, 43) hemp hackling and tow, 44) hemp spinning, 45) hemp weaving, 46) jute hackling, tow and spinning, 47) jute weaving, 48) artificial silk spinning, 49) artificial silk weaving, 50) clothing: felt, straw, felt and straw hats, 51) other clothing, 52) iron metallurgy, 53) no-iron metallurgy, 54) foundries and heavy mechanics, 55) rail and tram mechanics, 56) shipbuilding, 57) light mechanics and mechanics of precision, 58) silver and gold, 59) chemistry: acids, 60) matches, 61) wax and soap, 62) rubber, 63) chemical fertilizers, 64) explosives, 65) chemical dyes, 66) pharmaceutical products, 67) electrochemical and gas products, 68) other inorganic chemical products, 69) coal, oil and other organic chemical products, 70) pulp,</p>

71) paper and cardboard, 72) paper industry, 73) printing, 74) photography and cinema, 75) leather, 76) wood, 77) glass industry, 78) other no-metallic minerals manufacturing, 79) various industries, 80) construction, 81) utilities

*Services:* 1) foods and beverage retail, 2) other retail, 3) foods and beverage wholesale, 4) other wholesale, 5) peddlers, 6) pharmacists, 7) hotels, 8) room rents, 9) eating houses and restaurants, 10) coffee-bars and tea-rooms, 11) brokers and agents, 12) other trade mediators, 13) railways, 14) tramways, 15) cable railways, 16) mule drivers, 17) other horse transports, 18) sea transports, 19) lake and fluvial transports, 20) port services, 21) other loading services, 22) courier services, 23) mail service, telegraphs and telephones, 24) banks, 25) insurance services, 26) other financial services, 27) police services, 28) funeral services, 29) laundry services, 30) hairdressers, 31) shoeshine 32) baths, 33) chiropodists and masseurs, 34) other personal care services, 35) public exhibitions, 36) gymnastic teachers, 37) cantors and members of a choir, 38) dancers and mimes, 39) theatre artists, 40) other variety artists, 41) stage whispers and bouncers, 42) acrobats, conjurers and puppeteers, 43) musicians, 44) doctors and surgeons, 45) veterinarians, 46) dentists, 47) obstetricians, 48) nurses, 49) other health services, 50) charity employees, 51) private teachers, 52) music teachers, 53) clerical teachers, 54) lawyers and notaries, 55) engineers and architects, 56) surveyors, 57) paymasters, 58) painters, 59) designers, 60) models, 61) composers and music directors, 62) writers, translators and interpreters, 63) private employees, 64) secular clergy, 65) monks, friars and nuns, 66) priests of other cults, 67) clerical and church employees, 68) employees of no-Christian cults, 69) private investigators, 70) other private employees, 71) typing activities, 72) household services, 73) department of Finances, 74) department of Justice, 75) department of War, 76) department of Education, 77) department of Navy, 78) all the other departments, 79) local administration, 80) public welfare, 81) employees of recreational and educational centres, 82) housing.

Vitali (1970) has been used in order to allocate data between industry and services in some foods and beverage sub-sectors, for further details see Felice (2005b, p. 309).

1938	<i>Industry:</i> about the same as 1911, see Fenoaltea and Bardini (2000), Felice (2005a) <i>Services:</i> about the same as 1911, see Zamagni and Battilani (2000), Felice (2005a)
1951	<i>Industry:</i> about the same as 1911, see Fenoaltea and Bardini (2000), Felice (2005a) <i>Services:</i> about the same as 1911, see Zamagni and Battilani (2000), Felice (2005a)

Table A.3. *Estimates of women's and children's wages (as a share of men's wages)*

	Agricul- ture	Mining	Other Industry	Railw. and com- munic.	Other internal transp.	Sea transp.	Com- merce	Credits and insur.	Various services	Public admin.
1871										
<i>F</i>	0,50	0,50	0,40	0,40	0,40	0,40	0,50	0,35	0,50	0,35
< <i>M</i>	0,45	0,50	0,35	0,30	0,35	0,30	0,35	0,25	0,35	0,25
< <i>F</i>	0,35	0,35	0,25	0,20	0,25	0,25	0,30	0,20	0,30	0,20
1881										
<i>F</i>	0,45	0,45	0,40	0,40	0,40	0,40	0,50	0,35	0,50	0,35
< <i>M</i>	0,40	0,45	0,35	0,30	0,35	0,30	0,35	0,25	0,35	0,25
< <i>F</i>	0,30	0,30	0,25	0,20	0,25	0,25	0,30	0,20	0,30	0,20
1891										
<i>F</i>	0,40	0,40	0,40	0,40	0,40	0,40	0,50	0,35	0,50	0,35
< <i>M</i>	0,35	0,35	0,35	0,30	0,35	0,30	0,35	0,20	0,35	0,25
< <i>F</i>	0,25	0,25	0,25	0,20	0,25	0,25	0,30	-	0,30	0,20
1901										
<i>F</i>	0,45	0,45	0,45	0,45	0,45	0,45	0,53	0,375	0,55	0,45
< <i>M</i>	0,375	0,375	0,375	0,325	0,375	0,325	0,35	-	-	-
< <i>F</i>	0,275	0,275	0,275	0,225	0,275	0,275	0,25	-	-	-
1911										
<i>F</i>	0,50	0,50	0,50	0,50	0,50	0,50	0,55	0,40	0,55	0,50
< <i>M</i>	0,40	0,40	0,40	0,35	0,40	0,35	0,35	0,25	0,35	-
< <i>F</i>	0,30	0,30	0,30	0,25	0,30	0,30	0,30	0,20	0,30	-
1938										
<i>F</i>	-	-	-	0,55	-	-	0,60	-	0,60	0,60

Legend: *F*, females 15 years old or more; <*M*, males less than 15 years old; <*F*, females less than 15 years old.

Sources and notes: 1871 and 1881 estimates are derived from 1891, except for mining (elaborations from Young 1875) and for agriculture (in turn derived from mining); 1901 estimates are interpolations between 1891 and 1911; 1891 and 1911 estimates have been drawn from different sources, at the sub-sector level of table A.2, for details see Felice (2005b); in the cases of 1938 and 1951, for many sectors estimates have not been produced since the total amount of wages (thus per worker wages allowing for men, women and children workforce breakdown) was available, for further details see Felice (2005a).

Table A.4. Sources of productivity estimates and sub-sector VA 3 breakdown

1871	<p><i>Agriculture:</i> direct estimates, through regional quantities of the main products in 1870-74, from Maic (1878), and the regional ratios “total gross saleable production / gross saleable production of the main products” in 1891, from Federico (2003a); the national value of the main products in 1871 is derived from the total gross saleable production, under the hypothesis of the same shares as 1891; to convert production in value added, the regional shares of costs are the same as 1891. The main products are 1) wheat, 2) corn, 3) oat, 4) barley, 5) rye, 6) rice, 7) beans, peas and lentils, 8) broad beans, vetches, chickling, chickpeas, lupines, 9) hemp, 10) flax, 11) potatoes, 12) chestnuts, 13) wine, 14) olive oil.</p> <p><i>Industry:</i> Young (1875) referring to 1865, interpolated with 1891 for 1) mining; Fenoaltea (2004) for 2) textiles; in the cases of 3) foods and beverage, 4) tobacco, 5) clothing, 6) leather, 7) wood, 8) metallurgy, 9) mechanics, 10) no-iron minerals, 11) chemistry, 12) paper, 13) various manufacturing, 14) construction, 15) utilities, productivity is derived from 1891 through Fenoaltea (2004) textile productivity, see text.</p> <p><i>Services:</i> in the cases of 1) railways, tramways and communications, 2) other internal transports, 3) sea transports, productivity is derived from 1891 through Fenoaltea (2004) textile productivity, see text; in the cases of 4) commerce, 5) credits, 6) various services, 7) public administration, VA3-1 productivity is the average of agriculture, industry and transports productivity, weighted according to the corresponding shares of workforce, while VA3-2 productivity is derived from 1881 through transports and communication productivity, see text; direct estimates from taxation in 1871-75, from Maic (1908), for 8) housing.</p>
1881	<p><i>Agriculture:</i> direct estimates, through regional quantities of the main products in 1876-81, 1879-83 and 1880-85 from Maic (1887) and the regional ratios “total gross saleable production / gross saleable production of the main products” in 1891, from Federico (2003a); the national value of the main products in 1881 is derived from the total gross saleable production, under the hypothesis of the same shares as 1891; to convert production in value added, the regional shares of costs are the same as 1891. The main products are 1) wheat, 2) corn, 3) oat, 4) barley, 5) rye, 6) rice, 7) beans, peas and lentils, 8) broad beans, vetches, chickling, chickpeas, lupines, 9) hemp, 10) flax, 11) potatoes, 12) chestnuts, 13) wine, 14) olive oil, 15) citrus fruits, 16) forage, 17) silk cocoons.</p> <p><i>Industry:</i> interpolation of 1871 and 1891 for 1) mining; Fenoaltea (2004) for 2) textiles; in the cases of 3) foods and beverage, 4) tobacco, 5) clothing, 6) leather, 7) wood, 8) metallurgy, 9) mechanics, 10) no-iron minerals, 11) chemistry, 12) paper, 13) various manufacturing, 14) construction, 15) utilities, productivity is derived from 1891 through Fenoaltea (2004) textile productivity, see text.</p> <p><i>Services:</i> in the cases of 1) railways and tramways, 2) other internal transports, 3) sea transports, productivity is derived from 1891 through Fenoaltea (2004) textile productivity, see text; per capita savings from Maic (1887) for 4) credits and insurance; per worker profits estimated from Maic (1908) for 5) communications; the average of credits and communications productivity, weighted according to the corresponding shares of workforce, for 6) commerce, 7) various services, 8) public administration; direct estimates from taxation, interpolating 1871-75 (from Maic, 1908) and 1885-86 (from Maic, 1887), for 9) housing.</p>
1891	<p><i>Agriculture:</i> direct estimates from Federico (2003a) gross saleable production; for the regional shares of costs, see Felice (2005a, p. 7).</p> <p><i>Industry:</i> Maic (1893 and 1896) for mining; interpolation of 1881 and 1901 Fenoaltea (2004) productivity for 2) textiles; in the cases of 3) sugar, 4) other foods and beverage, 5) tobacco, 6) leather, 7) clothing, 8) wood, 9) metallurgy and mechanics, 10) silver and gold, 11) no-metallic minerals, 12) advanced chemistry, 13) traditional chemistry, 14) paper and printing industries, 15) various manufacturing, 16) construction, 17) utilities, productivity is derived from 1911 through Fenoaltea (2004) textile productivity, see text.</p> <p><i>Services:</i> Maic (1893) for 1) credits and insurance; in the cases of 2) commerce, 3) mail service, telegraphs and telephones, 4) laundry and personal care services, 5) show business services, 6) typing activities, household services, clerical and church employees, 7) other various services; 8) police, cleaning and funeral services, 9) health services, 10) other employees, productivity is derived from 1911 through credits and insurance productivity; in the cases of 11) horse and mule transports, 12) sea, lake and fluvial transports, productivity is derived from 1911 through Fenoaltea (2004) textile productivity; direct estimates from taxation in 1891, from Maic (1893), for 13) housing.</p> <p>For further details see Felice (2005b).</p>
1901	<p><i>Agriculture:</i> direct estimates, through regional quantities of the main products in 1891 and the interpolation of the regional ratios “total gross saleable production / gross saleable production of the main products” in 1891 and 1911, as derived from Federico (2003a); the national value of the main products in 1901 is derived from the total gross saleable production, interpolating the shares of 1891 and 1911; to convert production in value added, the regional shares of costs are the same as 1891 and 1911. Main products are the same as 1881; production of oat, barley, rye, beans, peas and lentils, broad beans, vetches, chickling, chickpeas, lupines, hemp, flax, potatoes, chestnuts, forage, wine is interpolated from 1891 (Maic, 1893) and 1911 (Maic, 1914b); the others are taken from Maic (1908) and refer to 1901-05.</p> <p><i>Industry:</i> interpolation of 1891 and 1911 for 1) mining; Fenoaltea (2004) for 2) textiles; in the cases of 3)</p>

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foods and beverage, 4) tobacco, 5) clothing, 6) leather, 7) wood, 8) metallurgy, 9) mechanics, 10) no-iron minerals, 11) chemistry, 12) paper and printing industries, 13) various manufacturing, 14) construction, 15) utilities, productivity is derived from 1891 and 1911 (interpolating) through Fenoaltea (2004) textile productivity, see text.

*Services*: in the cases of 1) total railways and tramways, 2) other internal transports, 3) sea transports, productivity is derived from 1891 and 1911 (interpolating) through Fenoaltea (2004) textile productivity; interpolation of 1891 and 1911 for 4) credits and insurance, 5) communications, 6) commerce, 7) various services, 8) public administration; direct estimates from taxation in 1901-02, from Maic (1908), for 9) housing.

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1911 *Agriculture*: direct estimates from Federico (2003a) gross saleable production; for the regional shares of costs, see Felice (2005a, p. 7).

*Industry*: Zamagni (1978) and Maic (1913) for 1) mining; Zamagni (1978) for 2) sugar, 3) other foods and beverage, 4) tobacco, 5) metallurgy, 6) shipbuilding, 7) vehicles, 8) other mechanics, 9) no-metallic minerals manufacturing, 10) advanced chemistry, 11) traditional chemistry, 12) paper and printing industries, 13) utilities; Fenoaltea (2004) for 14) textiles; Maic (1912) for 15) construction; the average of all the previous sectors, weighted according to the corresponding shares of workforce, for 16) other manufacturing sectors.

*Services*: in the cases of 1) commerce, 2) horse and mule transports, 3) loading services, 4) couriers services, 5) sea transports, 6) lake and fluvial transports, 7) port services, 8) mail service, telegraphs and telephones, 9) laundry and personal care services, 10) show business services, 11) typing activities, household services, clerical and church employees, 12) other various services, productivity is derived from 1938 through Maic (1912) construction wages, see text; Giusti (1914) for 13) police, cleaning and funeral services, 14) health services, 15) employees of recreational and educational centres; Maic (1893), Soresina (1992) and Felice (2006) for 16) credits and insurance; Doria (1967) for 17) cable railways. Direct estimates from taxation in 1911, from Maic (1913), for 18) housing.

For further details see Felice (2005b).

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1938 *Agriculture*: direct estimates from Federico (2003a) gross saleable production; for the regional shares of costs, see Felice (2005a, p. 7).

*Industry*: wages from Census of Industry and Commerce 1938, Istat (1938-50), approximately according to the same sub-sectors as Va 1.

*Services*: constant regional productivity in railways, air transport, communication and central administration; Tagliacarne (1937) for commerce, cleaning services, household services, clergy and employees of public agencies, local administration; Istat (1940) for show business services, professional services and other various private services; for all the rest, wages from Census of Industry and Commerce 1938, Istat (1938-50), approximately according to the same sub-sectors as Va 1; direct estimates from taxation, from Istat (1939b), for housing.

For further details see Felice (2005a).

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1951 *Agriculture*: direct estimates from Federico (2003a) gross saleable production; for the regional shares of costs, see Felice (2005a, p. 7).

*Industry*: wages from Census of Industry and Commerce 1951, Istat (1955-58), approximately according to the same sub-sectors as Va 1.

*Services*: constant regional productivity in railways, air transport, communication and central administration; wages from Census of Industry and Commerce 1951, Istat (1955-58), for commerce, cleaning and health services, show-business services; for all the other sectors the average of commerce, cleaning and health services, show-business services, weighted according to the corresponding shares of workforce; direct estimates from taxation, from Istat (1952), for housing.

For further details see Felice (2005a).

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