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The Origins of the Italian Regional Divide: Evidence from Real Wages, 1861-1913

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THE ORIGINS OF THE ITALIAN REGIONAL DIVIDE: EVIDENCE FROM REAL WAGES, 1861-1913

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ABSTRACT: The historical origins of the long lasting Italian North-South divide have always been controversial, but the scholarly debate has been hampered by the dearth of actual data on the size of the gap and its historical evolution. In this paper, we fill this gap by estimating a new provincial data-set of welfare ratios (Allen 2001) from the Unification of Italy in 1861 to World War One. Italy as a whole was very poor throughout the period, with a rather modest improvement since the late 19th century. This improvement had started in the North-West regions, the cradle of Italian industrialization, in the 1880s, while real wages in other macro-areas (North-East, Centre, South and islands) remained stagnant until the early 20th century, rising sizably only in the pre-war years. The gap between North-West and the South, already substantial in 1861 widened until the very end of the period. The Continental South was poorer than the North East, but not always of the Centre, while real wages in the Islands (i.e. Sicily) were close to national average.

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1. Introduction

The origins of the regional divide between Northern and Southern Italy is one of the oldest and most controversial issues in Italian economics and politics (Zamagni 1987, Russo 1991, Daniele and Malanima 2011, Felice 2013). Until recently, the existence of the gap and its changes in time was simply inferred from the very abundant anecdotal evidence on the backwardness of the South. Since the early 2000s, economic historians have started to rely on data, but this 'quantitative turn' has not yet settled the issue. Trends in regional GDP per capita are fairly well established in the 20th century: the gap surely widened with the industrialization of the North in the three decades before WWI, peaking just after WWII, reduced during the 'miracolo economico' (the Italian name for the Golden Age of the European economy) and widened again after 1971. The debate focuses on the first decades after the Unification, when GDP data are missing or very uncertain. Welfare measures, such as life expectancy, literacy and heights, suggest that the North was indeed more advanced than the South, but their relation with GDP is notoriously complex.

This paper contributes to the debate by estimating yearly series of real wages from the Unification to WWI, following the approach by Allen (2001). Real wages have been extensively used in macro-economic history as a source for the construction of consumption-side estimates of GDP for the 'pre-statistical age' (Fouquet and Broadberry 2015 and Malanima 2010 for Italy) and, more controversially, as a direct proxy for GDP per capita and standard of living (Bairoch 1989, Angeles 2008, Broadberry et al. 2015). This second strand in the literature was pioneered by Allen in his seminal 2001 paper. His method has been widely adopted to estimate standard of living in all continents since the early modern period. In this paper, we follow his approach as closely as possible to enhance the international comparability of our data. We collect yearly data on nominal wages for unskilled male workers, we estimate the cost of a survival (bare-bone) consumption basket with provincial prices and we compute the Welfare Ratio (henceforth WR) – i.e. the ratio of the number of baskets that the wage could buy to the needs of a typical household. We estimate separate series for each of the 69 Italian provinces (administrative units roughly similar in size to English counties) from 1861 to 1913, with some gaps in the period 1879-1904. We aggregate them by region and then in five economically homogeneous macro-areas – North-West, the cradle of the Italian industrialization, North East, Centre, South and Islands. Thus the present 'national' estimate refers to the whole territory of Italy rather than to specific cities as common in the literature.

After a short introduction to the literature on North-South gap (Section 2), we sketch out the

procedures of estimation in Section 3. Section 4 compares our series for Italy with a sample of series for advanced and less developed countries, while Section 5 discusses the differences by macro-area. Section 6 concludes.

2. Literature review

The debate on the causes of the North-South gap, the so called 'questione meridionale', is almost as old as Italy as a unified state (Felice 2007). Before and immediately after the Unification, the Italian *patrioti* had a very sanguine view of perspectives of the South. Most of them admitted that it was less developed than the North, but attributed its backwardness to the Borbonic misrule. Thus, the *patrioti* assumed that the South would have flourished in the new state thanks to political freedom (for the élites), free trade and public investment – most notably in railways. Once implemented, however, these policies did not work the expected wonders. The wake-up call was the publication of the diary of a journey in the South by two young Tuscan aristocrats (Franchetti 1875, Franchetti and Sonnino 1877) in the mid-1870s. Here it is impossible to follow the whole debate since the 1870s, and to describe in detail the policy measures adopted to improve the condition of the South. We will just quote the work by Nitti (1900), a Southern politician who masterminded the first 'special legislation' for Naples in 1904. He argued that Italy had invested too little in public works in the South after the Unification and he presented the 1904 law as a compensation for these missing policies. This claim has been disputed (Gini 1914: 257-277), but surely the state atoned for this alleged sins by supporting heavily the Southern development after 1951.

The new policies of the 1950s and 1960s stimulated the scholarly debate about the causes of the 'questione meridionale'. It was shaped by two radically opposed views of the situation after the Unification. On the one hand, Cafagna (1961) argued that the North-West, or more precisely the 'industrial triangle' (Piemonte, Lombardia and Liguria) industrialized because it had much greater development potential than any other region, with minimal economic interactions with the South (Federico and Tena 2014). On the other hand, Capecelatro and Carlo (1972) denied the very premise of the conventional wisdom, the existence of a North-South gap at the time of the Unification. The gap was created by the harsh 'neo-colonial' policy of the Savoy-dominated Italy[1].

[1] In their view, the Italian government first liberalized trade in order to destroy the budding Southern industry and then re-imposed duties which could benefit only the Northern industry. It extracted more taxes from the South than invested in public works, thwarted the development of Southern issue banks to favour the Piedmontese Banca Nazionale degli Stati Sardi and repressed ruthlessly the *briganti* (bandits) who tried to oppose to the Northern domination. According to Cerase (1975), the social and economic disruption in the South after the Unification caused emigration thirty years later.

Cafagna's view has become the conventional wisdom, but Capecelatro and Carlo's has been revived in recent years as one of cornerstone of the 'neo-borbonic' movement, which blames Unification for all the present harms of the *Mezzogiorno*.

After some years of lull, the debate on the causes of the gap has re-started in recent years. Firstly, A'Hearn and Venables (2013) have suggested that the North was richer than other regions at the time of the Unification thanks to its geographical advantages. It had more water and was more suited to the production of silk, Italy's main staple and that after 1890 it benefitted from protectionist policies and increasing market access. Secondly, Felice (2013) has returned to traditional view, rephrasing it using the fashionable Acemoglu and Robinson (2012) dichotomy of inclusive versus extractive institutions. The Southern élites resisted any change which could jeopardize their political power – most notably investment in education and health (Felice and Vasta 2015). Last but not least, in contrast with both the 'neo-borbonic' and the Cafagna views, Ciccarelli and Fenoaltea (2013) have tentatively suggested that market-integrating policies could explain industrial growth at least in some provinces of the South after the Unification. For the first time, these conjectures have been also subject to econometric testing. Felice (2012) explains the divergence before WWI with the lower endowment of human capital in the South. This hypothesis is supported by the results by Cappelli (2016) on the positive effect on school enrollment in the South of the Daneo-Credaro Law (1911), which shifted the funding of primary school from local authorities to the State central budget. Missiaia (2016) and Daniele, Malanima and Ostuni (2016) find some evidence for a positive role of domestic market access for the development of the North, although they disagree on the compensating role of a better access to foreign markets for the South. Ciccarelli and Fachin (2016) shows that both human and social capital affected positively the growth in labor productivity in manufacturing from 1871 to 1911, once spatial dependence is taken into account.

Any quantitative tests of the competing hypotheses would need reliable series on regional GDP at least since the Unification. For instance, the traditional view and the Capecelatro and Carlo (1972) story imply two very different levels of the North-South gap in GDP at the time of the unification. The former implies that it was already large, and possibly centuries-old, the 'neo-borbonic' view that it was created by Unification. Unfortunately, estimating historical series of GDP by region (or macro-areas) has proved to be very hard. Eckhaus (1961), after reviewing the available evidence, suggested a difference in per capita income between North and South between 15 per cent and 25 per cent. Later, Zamagni (1978) and Esposto (1997) estimated GDP

per capita by region. Anyway, these early attempts have been largely ignored in the debate, which has relied on anecdotal evidence until very recently.

The recent quantitative turn is arguably a by-product of a research project on national accounts, which produced four nation-wide benchmark estimates of GDP for 1891, 1911, 1938 and 1951 (Rey 1992 and 2000), later joined in a yearly series from 1861 onwards by Baffigi et al (2013). Felice (2005) allocated the two earlier estimates by region, using the data on gross agricultural output by Federico (1992 and 2000) and his own estimates for other sectors, with a variant of the Geary and Stark (2002) method, which uses regional wages as proxy for productivity differentials. Daniele and Malanima (2007) extrapolated the Felice data for 1891 to 1861 for North and South, assuming parallel change of GDP in each area. In a later work, Felice (2009) disaggregated also the benchmarks for 1938 and 1951 and above all added a new benchmark for 1871. Unfortunately, these latter estimates are less solid than others. Felice used the official agricultural statistics (MAIC-DGA 1876-1879), which suffer from heavy overvaluation of cereal output in Campania (Federico 1982), and the wages data by Young (1875), which refer to a restricted number of firms and mining establishments in few regions. It would be worthwhile, therefore, to re-estimate the non-industrial value added using our newly compiled wage data-set. These estimates by Felice, in their latest revision (Brunetti, Felice and Vecchi 2011), have been used as dependent variable by Cappelli (2016) and Missiaia (2016) as well as by Felice himself (2012)[2]. Overall, the quantitative turn is a big step ahead in our knowledge but, as the recent debate between Daniele and Malanima (2014a, 2014b) and Felice (2014) shows, the issue of the timing of divergence is far from settled. We report all the available estimates, including the earlier ones, in Table 1[3]. They suggests three points: *i*) without a proper 1861 estimate, it is impossible to know whether the 1860s featured a deterioration of the relative conditions of the South as suggested by Daniele and Malanima (2014b: 246), and *a fortiori* to assess the responsibility of the new government; *ii*) as posited by the conventional wisdom, the South was poorer in 1871, but the gap was not so large and Campania fared quite well; *iii*) the difference widened from 1871 to 1891 and (much more) from 1891 to 1911, the years of the first process of industrialization.

[2] On a separate line of research, Ciccarelli and Fenoaltea (2013) have produced regional series for industrial VA, but they had to assume, for some sectors, that productivity by sector was equal across Italy, so that regional gaps in industrial VA capture only the differences in GDP composition.

[3] We reproduce here the latest version of estimates by Daniele and Malanima (2011) and Felice (2014) as both refer to present-day boundaries of the regions (a major point of discussion) and are thus comparable. We average Felice's estimates of Abruzzi and Molise and Piemonte and Valle d'Aosta (with weights 90% and 10%) and we omit the figures for Trentino-Alto Adige and Friuli-Venezia Giulia. Actually, Friuli-Venezia Giulia in its present-day boundaries includes the province of Udine, which before 1911 was part of Veneto, but the estimate of GDP of that region seems to be heavily affected by the inclusion of the very rich city of Trieste.

Table 1. Italian regional GDP in the Liberal age by different authors (Italy = 100)

Regions	Esposto (1997)			Zamagni (1978)	Daniele-Malanima (2007)		Daniele-Malanima (2011)		Felice (2014)		
	1871	1891	1911	1911	1861	1871	1891	1911	1871	1891	1911
Piemonte		103	132	126			101	114	102.3	107.0	116.4
Liguria		141	151	143			122	145	138	139	157
Lombardia		119	144	138			111	120	114	114	118
Veneto		92	93	89			79	84	106	81	88
Emilia-Romagna		107	119	114			107	109	96	106	109
Toscana		109	105	101			101	97	106	103	98
Marche		98	92	88			92	84	83	88	82
Umbria		110	94	90			106	88	99	106	92
Lazio		129	131	126			129	122	134	137	133
Abruzzi		70	72	70			72	69	80	68	69
Campania		78	85	81			110	105	109	99	96
Puglia		108	89	83			110	89	89	104	87
Basilicata		70	72	70			77	73	67	75	74
Calabria		75	63	61			72	72	69	68	71
Sicilia		93	73	70			101	89	95	95	87
Sardegna		99	83	79			98	93	77	97	93
North-West	108	113	141						114	114	122
North-East and Centre	106	106	106						100	99	98
North and Centre					99.7	100.5	103.0	107.0	*106*	*106*	*108*
South and Islands	87	85	78		100.2	99.5	96.0	88.0	*90*	90	85

Sources: Zamagni (1978: Tab. 58); Esposto (1997: Tab. 3), Daniele and Malanima (2007: Tab. 4); Daniele and Malanima (2011: Appendix, Tab. 2.1 and 2.2); Felice (2014: Tab.1).

When GDP data are missing or dubious, one can rely on proxies. Table 2 sums up the results of recent works: North was well ahead South on social indicators such as heights (A'Hearn and Vecchi 2011), life expectancy and educational attainments (Felice and Vasta 2015). This would support the traditional thesis but it is surely not sufficient evidence, as the correlation between GDP per capita and social indicators is far from perfect. Fenoaltea (2003) and Ciccarelli and Fachin (2016) use labor productivity in industry, which is not sufficient evidence either as industry accounted only for a fifth of Italian GDP in 1891 and 1911 (Rey 2002: Tabb. 2 and 3).

As said in the introduction, real wages are the most widely used proxy for GDP in the international literature but so far, nobody has estimated regional wages in Italy after the unification. All the available series, starting with the pioneering work by Geisser and Magrini (1904) refer to the whole country. In the 1960s and 1970s, historians such as Merli (1972) quoted data on (low) nominal wages as evidence of capitalistic exploitation of workers, but the first 'modern' wage series were published in the 1980s. Zamagni (1984, 1989) estimated wages of male workers in industry from 1890 to 1913, and Fenoaltea (1985) and Federico (1994: 574) built series for construction workers and female silk reelers since 1861. All these authors deflated nominal wages with the ISTAT (1958) consumer price index, while in a later work Fenoaltea (2002) produced a new price index (essentially an average of the ISTAT index with prices of bread and flour to increase the weight of these latter on consumption), estimating also separate series for skilled and unskilled workers. So far this latter paper remains the reference work on wages after the Unification. Recently, Malanima (2013, 2015) has produced welfare ratios for the period before 1860 for Napoli, Milano and Vercelli. He concludes that 'there are no reasons to suppose that wages in a city like Napoli were inferior to those in a city like Milano' (2013: 359). However, he does not extend his market specific series beyond 1861, relying on Fenoaltea (2002). Thus, our series are the first systematic attempt to deal with differences in real wages after the Unification.

Table 2. Regional indicators of well-being for benchmark years

Regions	HDI			Life expectancy			Heights		
	1871	1891	1911	1871	1891	1911	1871	1891	1910
Piemonte	0.380	0.457	0.517	37.1	43.9	47.7	163.9	165.3	167.4
Liguria	0.346	0.436	0.514	35.7	41.6	46.7	164.5	166.1	167.8
Lombardia	0.347	0.435	0.482	33.5	41.1	42.3	164.3	165.6	167.1
Veneto	0.318	0.412	0.488	35.2	44.3	47.6	165.9	166.5	167.9
Emilia-Romagna	0.273	0.374	0.485	32.9	40.2	47.6	164.5	165.2	167.0
Toscana	0.273	0.377	0.472	31.0	41.6	48.2	164.6	165.9	167.0
Marche	0.256	0.338	0.434	34.2	41.2	48.9	163.2	163.4	164.8
Umbria	0.272	0.346	0.442	36.6	40.8	48.8	163.1	163.7	165.2
Lazio	0.264	0.398	0.486	29.1	39.6	45.2	163.0	164.8	165.2
Abruzzi	0.217	0.277	0.385	30.7	35.8	45.6	161.5	162.8	163.7
Campania	0.241	0.306	0.375	30.7	35.8	38.9	162.1	162.9	163.6
Puglia	0.215	0.286	0.364	30.7	35.8	40.3	161.9	162.9	163.4
Basilicata	0.200	0.259	0.348	30.7	35.8	42.3	159.7	161.5	161.9
Calabria	0.195	0.249	0.348	30.7	35.8	44.1	160.7	161.9	163.3
Sicilia	0.233	0.284	0.366	35.5	36.4	39.5	161.8	161.9	163.8
Sardegna	0.216	0.302	0.393	31.6	37.6	43.5	159.8	160.8	161.3
North-West	0.359	0.439	0.498	34.9	41.5	44.5	164.1	165.5	167.2
North-East	0.298	0.397	0.487	34.2	42.5	47.6	165.4	165.9	167.6
Centre	0.271	0.372	0.472	32.0	41.0	47.7	163.8	164.9	165.9
South	0.222	0.286	0.370	30.7	35.8	41.4	161.5	162.6	163.4
Islands	0.231	0.287	0.372	34.7	36.6	40.3	161.4	161.6	163.3
Italy	0.282	0.360	0.442	33.1	39.3	44.1	163.3	164.4	165.8

Sources: HDI: Felice and Vasta (2015: Tab. 1); Life expectancy: Felice and Vasta (2015); Heights: A'Hearn and Vecchi (2011: Tab. 2.1).

3. Sources and methods

Allen (2001) defines the welfare ratio as:

$$WR=[(Wd*Nd)/ \Sigma(Pj*Qj)]/D \quad (1)$$

Where Wd=daily wage for male worker, Nd the number of days worked, D is the number of members of the household in consumption units, Pj is the price of the j-th good and Qj the fixed quantity of the j-th good. If WR=1 the male breadwinner wage is exactly sufficient to sustain the household.

In his first paper (Allen 2001) suggested to use two sets of welfare ratios, corresponding respectively to mere subsistence (the 'bare-bone' basket) and to a slightly better standard of living (the 'respectable' basket). The former is designed to give each consumption unit the minimum amount of food to work, at the lowest possible cost, plus the barest minimum for lodging, clothing and fuel. Allen suggested a minimum of 1,940 calories and, lacking information, assumed 250 days of work (5 days for 50 weeks) and an average household of four members, the male breadwinner, his wife and two children – for a total of 3 consumption units. He then added rent as a markup of 5 per cent to the cost of the basket, yielding a total of 3.15 baskets per household. These coefficients have afterwards become an international standard, with very modest changes. However, in a recent paper Allen (2015), answering to critical comments by Humphries (2013), has admitted that these parameters might be too low for 18th-19th century England, suggesting a revision of the basket to 2,100 calories *per capita* (still assuming a family of four members). However, in this paper, we follow the 'original' standard basket of 1,940 calories for the sake of international comparability.

As said in the introduction, we estimate separate series for 69 provinces, which we aggregate by region and macro-area (North-West, North-East, Centre, South, Islands) as:

$$WR^m=\Sigma\omega^i*[((W^i_d*N^i_d/\Sigma(P^i_j*Q^i_j))/D] \quad (2)$$

Where ω^i is the share of the i-th province on the total population of the relevant area (region or macro-area) according to Population censuses (MAIC 1864-65, 1874-76, 1885,

1901-04, 1914-16) linearly interpolated. All our parameters, except the number of members of households (D), are in principle province specific.[4] In particular, we use the information of the number of days worked in each province as reported in an official enquiry of the early 1870s (MAIC-DGA 1876-79). However, the difference with the wage series computed with Allen's assumption of 250 days of work is minimal: the coefficient of correlation for the whole country is 0.999.[5]

In order to have more reliable estimates on the difference areas of the country, we have taken into account that the traditional Italian diet differed substantially across regions (Betri 1998, Teti 1998). The fundamental distinction in food consumption patterns concerned two main items. Northerners used butter rather than oil, and ate much more *polenta* (maize) than Southerners, as shown by the composition of gross output of cereals (Federico 1992, 2000). Correspondingly, we use different bare-bone baskets for: *i*) Northern regions that were 'regular' consumers of maize; *ii*) Northern regions that were 'intensive' consumers of maize; *iii*) Central regions whose diet comprised also some maize; *iv*) Southern and Central regions where maize was not part of the diet (Table 3).

Table 3. Regional bare-bone baskets for Italy

	Unit	Calories per unit	Quantity per year			
			Maize Regions North	High Maize Regions North	Maize regions Centre	No Maize regions Centre and South
Maize (polenta)	kg	3200	86.6	139	86.2	0
Wheat bread	kg	2450	112.6	44.2	112.6	225.2
Meat (beef)	kg	2500	5	5	5	5
Wine	L	850	90	90	90	90
Olive oil	L	9000	0	0	5	5
Butter	kg	7286	6	6	0	0
Eggs	no	79	40	40	40	40
Beans	Kg	956.25	20	20	20	20
Firewood	Kg		547.5	547.5	547.5	365
Linen (cotton)	g		750	750	750	750

Notes: Calories per unit are based on Malanima (2013, 2015). The regions are divided as follows: Maize Regions North: Piemonte, Liguria, Emilia Romagna; High Maize Regions: Lombardia, Veneto; Maize Regions Centre: Marche, Abruzzo, Umbria; No Maize Regions: Toscana, Lazio, Campania, Puglia, Basilicata, Sardegna, Sicilia.

[4] Data on the number of household members are available only for the 1911 Census. According to this source (MAIC 1914-1916, vol. 1, p. 568 ff), the Italian average is 4.58, ranging from Porto Maurizio (3.75) to the outliers provinces of Veneto: Treviso (6.84), Padova (6.25) and Rovigo (5.80). However, the median is 4.65. Provinces with largest families were characterized by large agricultural households with more than one adult working man. As we already mentioned, we have decided to keep D=4 in order to allow an international comparative perspective.

[5] The nation-wide average of the number working days is 251.4, ranging from Cagliari (192) to 300 in few provinces.

We estimate daily wages (W^i_d) and prices (P^i_j) from a variety of (mostly official) sources. We quote them and we describe the procedures of elaboration in detail in Appendix 1. Here we provide only the basic information. We use two main sources for nominal wages of unskilled workers – an enquiry on wages paid by state for public works (MAIC-DGS n.d.) and the monthly *Bollettino dell'Ufficio del Lavoro* (MAIC *ad annum*). The former reports yearly averages of daily wages for all Italian provinces (but Parma) from 1862 to 1878. In contrast, the BUL publishes monthly data, for many locations within each province, for a large number of specific agricultural tasks from 1905 onwards, which we have used to estimate the yearly income of Italian wage workers.[6] The available evidence for the period 1879-1904 is much less abundant. We have been able to find wage data for 27 provinces, 5 in the North West, 2 in the North East, only 1 in the Centre, 12 in the South and 7 in the Islands. We test the size of the potential bias from the limited geographical coverage by comparing our baseline series (with all 69 provinces) in 1862-1878 and 1905-1913 with a reduced series featuring only 27 provinces. The nationwide series are very similar, as the outcome of a perfect coincidence in the Islands, of an almost perfect coincidence in the South and in the North West and of a good correlation in the North-East. The differences are sizeable only for the Centre as prices in Florence, the only available province, were much higher than in the rest of the macro-area.[7]

We perform two additional robustness checks on the level of wages, relying on two other official publications, the already quoted enquiry on agricultural wages in the early 1870s (MAIC-DGA 1876-79) and enquiry on wages of construction workers in 1906 (MAIC 1907).[8] We compute the ratios to our wages weighting the provincial data with the population (Table 4). Results are quite encouraging: the nationwide gap is small and rather constant in time, and also the regional ratios do not differ much from 1, with the exception of the Islands in 1870 and the North West in 1906. This suggests a fairly high degree of integration in the local labor markets.

[6] This source has been used by Arcari (1936) to compile yearly wage series which have been widely used by economic historians. We have preferred not to use the Arcari data because they do not use all available information and do not take into account the seasonal movements in wages while averaging monthly data.
[7] The coefficients of correlation for the periods 1862-1878 and 1904-1913 are 0.992 for Italy, 0.997 South, 0.994 Islands, 0.988 North-West, 0.966 North-East and 0.893 for the Centre. The difference for this latter is particularly wide on the eve of WWI.
[8] The source reports data for different categories of workers and the denominations change somewhat across provinces. We select for each province the lowest wage.

Table 4. Robustness checks for nominal wages

	1870	1906
North West	0.97	1.15
North East	0.99	1.10
Centre	1.04	0.90
South	0.92	1.05
Islands	1.17	1.01
Italy	0.99	1.05

Sources: our own elaborations on MAIC-DGA (1876-79) and MAIC (1907).

Our main sources for prices are MAIC-DGS (1886), the weekly *Bollettino settimanale dei prezzi* (MAIC-DGS *ad annum*) for 1874-1896 and MAIC (1914) for 1897-1913.[9] MAIC-DGS (1886) reports wholesale prices for wheat, wine olive oil and corn and retail price of meat from 1862 to 1885 for a varying number of provinces – up to 23 for wheat. The *Bollettino* covers all provinces and reports retail prices of bread (since 1880 only) and meat and wholesale prices of wine, corn, olive oil and firewood (since 1880 only). MAIC (1914) reports the prices paid by the *Convitti nazionali* (a sort of boarding schools), which were probably somewhat lower than 'retail' prices for ordinary consumers, for bread, wine, olive oil meat, butter and eggs . When necessary, we convert wheat prices into bread prices with a 'bread equation' (Allen 2001):

$$Pbread = A+B*Pwheat+\sum[C(i)*Province(i)]+\sum[D(j)*Year(j)] \quad (3)$$

where Pbread is the price of bread and Pwheat is the price of wheat, and Province and Year are dummies. We estimate the bread equation with data on bread and wheat prices for the period 1880-1896 (MAIC-DGS *ad annum*), getting a coefficient B=0.485. We estimate crudely regional prices for fava beans by applying the difference in levels in the 1850s (Bandettini 1957, Felloni 1957, Delogu 1959) to the nation-wide series from ISTAT (1958).

Unfortunately, we have not been able to find regional prices for lamp oil, candles, and soap and cotton cloth. We use the series from ISTAT (1958) for the first three items, while for cotton cloths we adjust the price of cotton yarn from Cianci (1933) for 1870-1913 and then we extrapolate the resulting series back to 1862 with the price of raw cotton in the United Kingdom from Mitchell (1988). Using a single series for all provinces might reduce

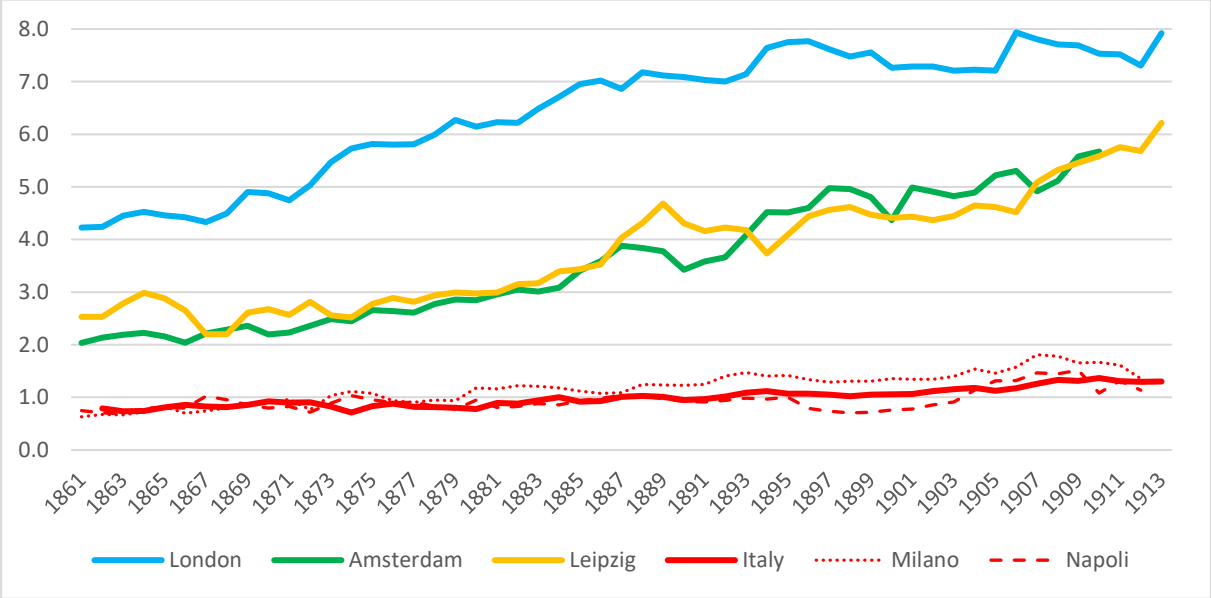
[9] We fill the gaps by province from these three sources with simple average of neighboring provinces.

variance but these goods accounted for a very small share of total budgets and thus the distortion is very small. Following Allen (2001) we add 5% to the cost of basket for rents.

4. Trends in real wages in comparative perspective

Figure 1a shows a large gap in standard of living between Italy and the most developed European countries, here represented by Allen's estimates for three large cities.[10] Before 1883, the Italian WR remained below 1 – i.e. an unskilled labourer working full time could not earn enough to support his family, even at the minimum subsistence level. It reached 1 for the first time in 1884 and fluctuated around 1 until the early 1890s. Thereafter it started to grow, with some acceleration in the 1900s, but on the eve of WWI, the ratio was only 1.3. As a result, the gap with the most advanced countries, where the WR increased remarkably, had further widened. The ratios for Milan and Naples show that big cities traced quite well the nationwide averages.

Figure 1a. Welfare ratio in comparative perspective: Italy versus developed countries

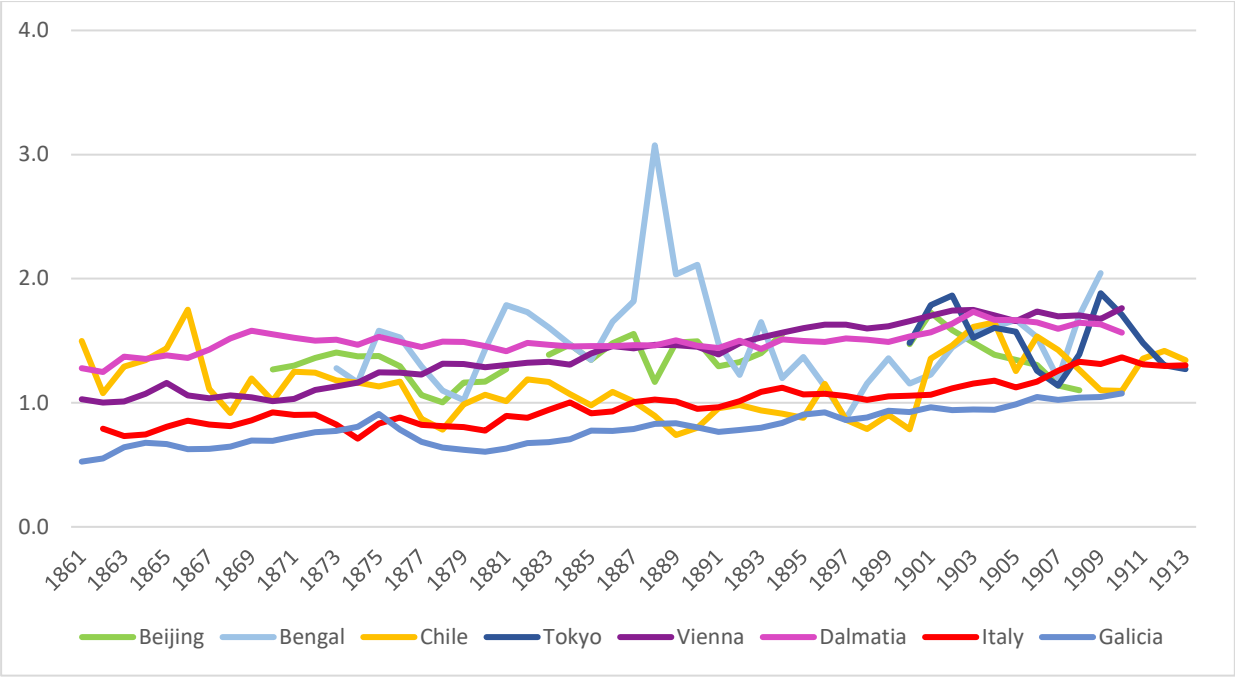


Sources: our own elaborations on data kindly provided by Robert Allen previously presented in Allen (2001) and in Allen et al (2011).

Remarkably, Italy was quite poor even if compared with other European peripheral countries, such as Austria, and with less developed countries in other continents (Figure 1b).

[10] For the sake of comparability with other estimates in the Figure, we plot our series with 250 days of work rather than the series with province-specific number of days. As said, the difference between the two series is very small.

Figure 1b. Welfare ratio in comparative perspective: Italy versus less developed countries



Sources: our own elaborations on data kindly provided by Robert Allen, Myung Soo Cha and Tomas Cvreck previously presented in Allen et al (2011), Cha (2015 and Cvreck (2013).
Note: as for Dalmatia and Vienna, we doubled the data by Cvrcek considering that Allen's bare-bone basket costs about 50 per cent of his respectable basket. Cvrcek's respectable basket is even richer and bigger than Allen's respectable basket and thus the welfare ratios of Dalmatia and Vienna might be slightly undervalued (Cvrcek 2013: footnote 17).

The Italian ratio standard of life remained for most of the period the lowest of the sample and its growth since the 1890s brought the ratio only to the same level of urban wages in Chile, Japan and China. This result may seem surprising but the low level of the ratio, as well as its upward trend, is consistent with the estimates by Malanima (2015).[11] On the other hand, the gap between Italy and the advanced countries was much smaller in GDP per capita than in WR, while Italy's GDP was significantly higher than the Japanese and above all the Chinese one.[12] This suggests that the distribution by factor of production in Italy was more unequal than in these other countries. Furthermore, our findings are consistent with the available evidence on heights (Federico 2003, Peracchi 2008, A'Hearn

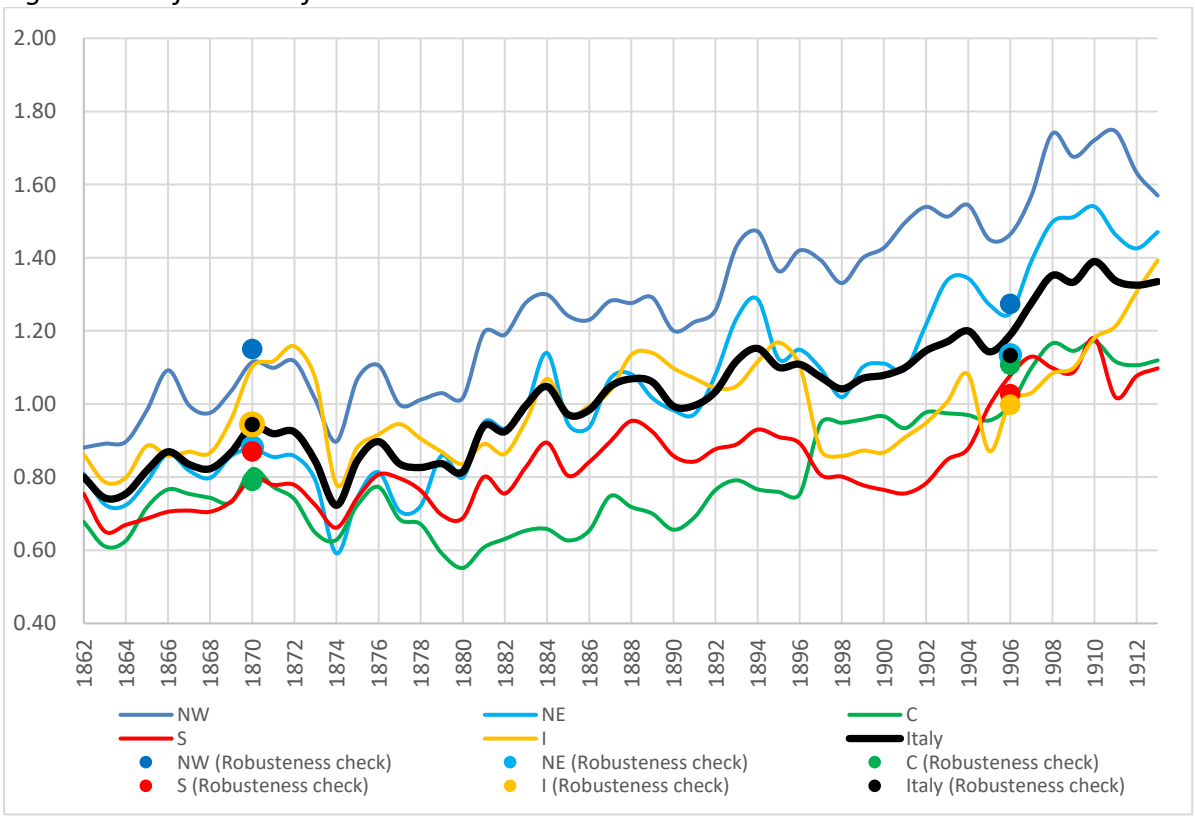
[11] According to Malanima estimates, the daily wage of a *bracciante* (agriculture unskilled worker) would purchase between 4 and 8 daily bare-bone baskets. This latter, however, features a daily consumption of 2,200 calories, and no expenditures for heating, clothing, lighting and housing. Malanima's figures can be expressed in terms of our yearly welfare ratio by dividing by 0.88 (1,940/2,200), multiplying by 0.68 (250 days of paid work for 365 days of consumption) dividing by 3.15 and finally multiplying by the share of food on the cost of our bare-bone basket. This latter changed in time with an average of 86 per cent over the whole period. Thus, 4 'Malanima' baskets equal to 0.84 of our baskets (and, by definition, 8 correspond to 1.69).
[12] According to the latest data of the Maddison project (2013), the Italian GDP per capita in 1913 was 46 per cent of the British one, 57 per cent the Dutch one, 63 per cent the German one, 67 per cent the Austrian one (at 1995 boundaries), 77 per cent the Chilean one, while it exceeded the GDP of Japan by 66 per cent and was about four times higher than the Chinese one.

and Vecchi 2011 and, for an international comparison, Baten and Blum 2014). In a nutshell, Italy was very poor, in spite of the modest improvements in the pre-war period.

5. Real wages and the Italian regional divide

Figure 2 presents our main estimates of the WR for the Italian macro areas.[13] The gap between North (both West and East) and the Continental South was already sizeable at the time of the Unification and real wages remained more or less flat in the following twenty years. Thus, our results seems to be more in line with the conventional wisdom (Felice's view) than with the revisionist approach endorsed by Daniele and Malanima (2007). In particular, we do not find any support for the notion of a sudden and drastic impoverishment of the South due to the unification (Capecelatro and Carlo 1972).

Figure 2. Welfare ratio for unskilled workers



Sources: our own elaborations (see text and the Appendix).

From the 1880s, real wages in the North-West started to grow, likely as a consequence of the early industrialization of the 'industrial triangle'. The trend accelerated at the turn of the century, peaking in 1910-1911 around 1.75[14]. In contrast, in other macro areas, real

[13] In this Figure, as in Table 4, we use the more accurate estimates with province-specific number of workdays.
[14] The decline in 1912-1913 reflects a sharp rise in wine prices.

wages fluctuated without any clear trend until the first years of the new century. From 1905 to 1913, the ratios boomed in the Islands (59.9 per cent) and increased substantially also in the North East (15.6 per cent), the Centre (17.2 per cent) and the South (10.3 per cent).

The cases of the islands (i.e. mostly Sicily) and of the Centre need some additional comment. The WR for the islands is very similar to the national average throughout the period (1.4 per cent higher) and it boomed around 1870, exceeding in 1872 the level of the North-West. The comparatively high ratio might reflect the low employment rates for women, which made it necessary to pay higher wages to males in order to guarantee the survival of the household. Indeed, the gender ratio of agricultural workers (female over males) for the islands, according to population censuses, was 0.13 in 1871 and declined to 0.11 in 1911, while in the rest of the country it increased from 0.63 to 0.73 (MAIC 1874-76, Vitali 1968). We speculate that the rise of the 1870s reflected the massive investment in public works, which created temporary shortage of work force in the construction labour market. Indeed, the wages of construction workers in 1870 were 17 per cent higher than agricultural wages (Table 4). The very low ratios in the Centre are consistent with the evidence on incomes for sharecroppers, who accounted for a large majority of occupied in agriculture, in the early 20th century[15]. They received incomes in kind as lodging and they had an implicit right to be helped in case of distress. Furthermore, market wages were reduced by the supply of labour from members of sharecropping households moonlighting for causal work. Why did WR rise in the long run? As a first step, we decompose the proximate causes of changes between prices and wages. In Table 5, we report the absolute changes in WRs and (in italic) the shares accounted for by changes in wages. For instance, in 1862-1878 the WR in the North West increased by 24 per cent and wages accounted for 160.4 per cent of the rise – i.e. had prices remained stable, the ratio would have augmented by 38.5 per cent[16]. The results highlight a substantial difference between periods. Over the whole period, and especially during the Giolittian boom, WR increased thanks to the growth of wages, in spite of a prices rise. The rise in wages accounted also for the very modest increase from 1862-1880, with the notable exception of the North-East. In contrast, in 1879-

[15] The average yearly income for work unit was 251 lire in a sample of 52 Tuscan farms for 1891-1900 (Linari 1902), 300 lire in Umbria in 1903-1904 (Faina 1905), 485 in Valdelsa in the province of Siena in 1896, 489 in Valdarno and 396 in Pistoia in 1895 in the province of Firenze (Guicciardini 1907). We estimate a yearly wage on 392 lire in Tuscany in the 1890s and 385 in Umbria in 1905.

[16] We minimize the risk of spurious results by using Hodrick-Prescott filtered series of wages and prices and computing the corresponding welfare ratios.

1895, WR rose mostly thanks to the fall in world prices of cereals, which caused a decline in the cost of the bare-bone basket in spite of the protection on wheat.

Table 5. Change in Welfare ratios and the contribution of wages

	North-West	North-East	Centre	South	Islands	Italy
1862-1880	24.0	-1.9	11.0	5.9	7.2	9.5
%	*160.4*	*-679.4*	*238.4*	*384.3*	*231.6*	*259.0*
1880-1895	27.6	52.9	17.1	17.2	20.1	24.0
%	*-34.2*	*31.6*	*13.5*	*18.2*	*28.9*	*5.7*
1896-1913	15.3	19.4	51.2	23.7	31.8	28.4
%	*366.2*	*254.4*	*125.7*	*269.0*	*196.7*	*212.5*
1862-1913	82.5	79.2	96.6	53.4	69.7	74.3
%	*130.4*	*122.6*	*117.0*	*191.6*	*143.1*	*140.0*

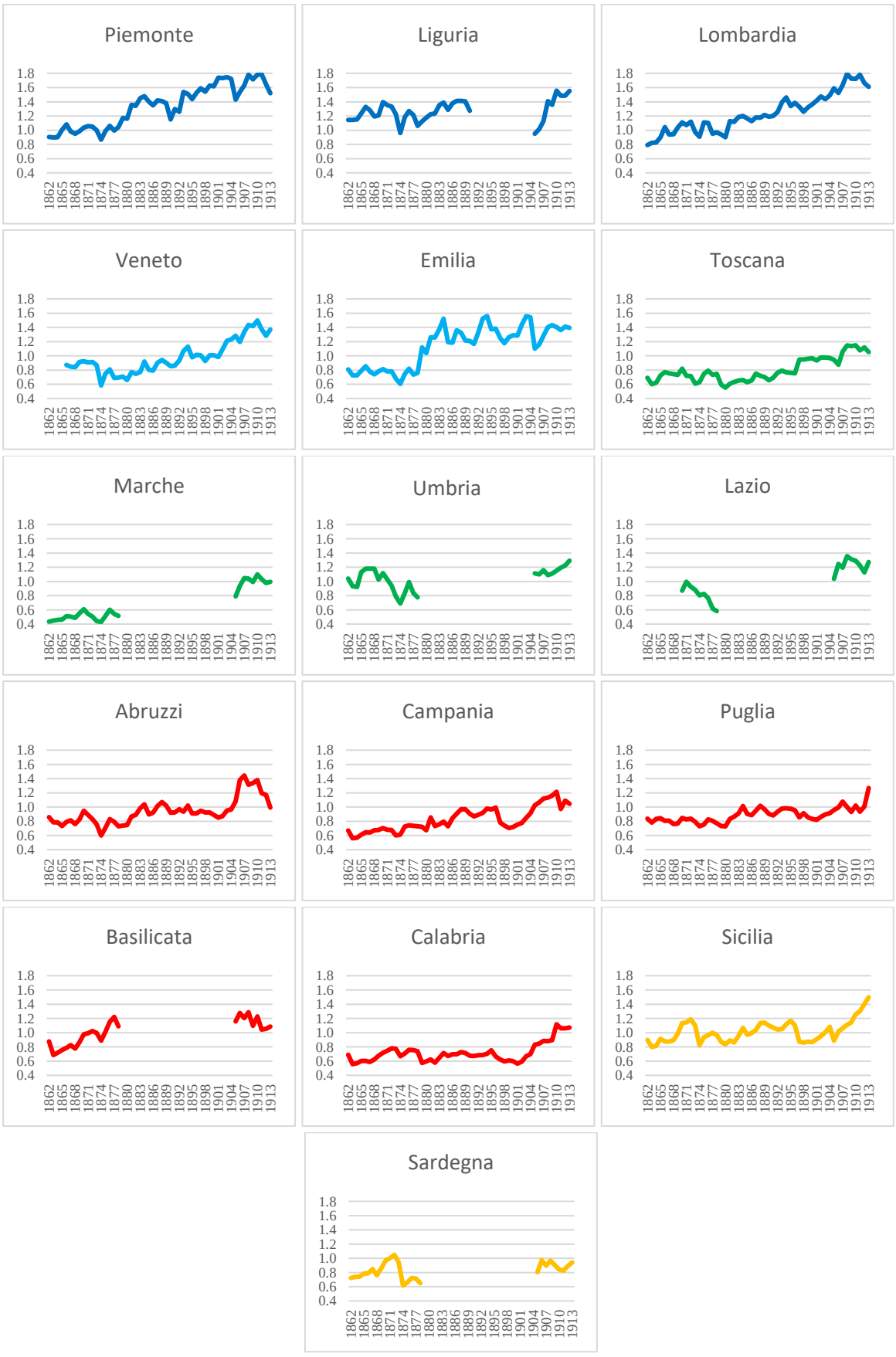
Sources: our own elaborations (see text).

There is no doubt that the wages rise in the industrial triangle, after 1895, reflected the beneficial effects of industrialization. Industrial growth in other macro-areas was late and limited, and thus the differences among them are likely to be related to migrations (Taylor and Williamson 1997). Emigration from Italy started in the 1880s but until 1905 the available data (seriestoriche.istat.it) refer to gross flows and thus, given the massive return migrations which featured the Italian experience, the overall impact is difficult to assess. Hatton and Williamson (1998) overstate the impact on the labour market. The cumulated total 1905-1913 was equivalent to about 11.6 per cent of the Italian population according to the 1911 Census (MAIC 1914-16). Migration was substantial from all macro-areas (16.2 per cent of 1911 population from the North-East, 15.5 per cent from the Islands, 14.2 per cent from the South and 11.6 per cent from the Centre) but the North West (only 3 per cent). However, the effect of migrations on the labour market was short-lived, as WWI and American restriction to immigration stifled the flow, preventing any further relative rise of WR in the South.

The discussion so far has focused on macro-areas, but, as strongly stressed by several authors (Salvemini 1984, Pezzino 1987, Donzelli 1990), there were more dynamic areas within the South, while even in the North-West there were agricultural areas hardly touched by industrialization. We explore differences within macro-areas by plotting yearly series of WR by region (Figure 3) and mapping welfare ratios by province in 1862, 1878 and 1911 (Figure 4)[17].

[17] We have chosen these years because we have been able to estimate ratios for all provinces (see Appendix). Likewise, the regional series for Liguria, Marche, Umbria, Lazio, Basilicata and Sardegna feature gaps in 1879-1904 because we have been unable to find wages series for any province in those regions.

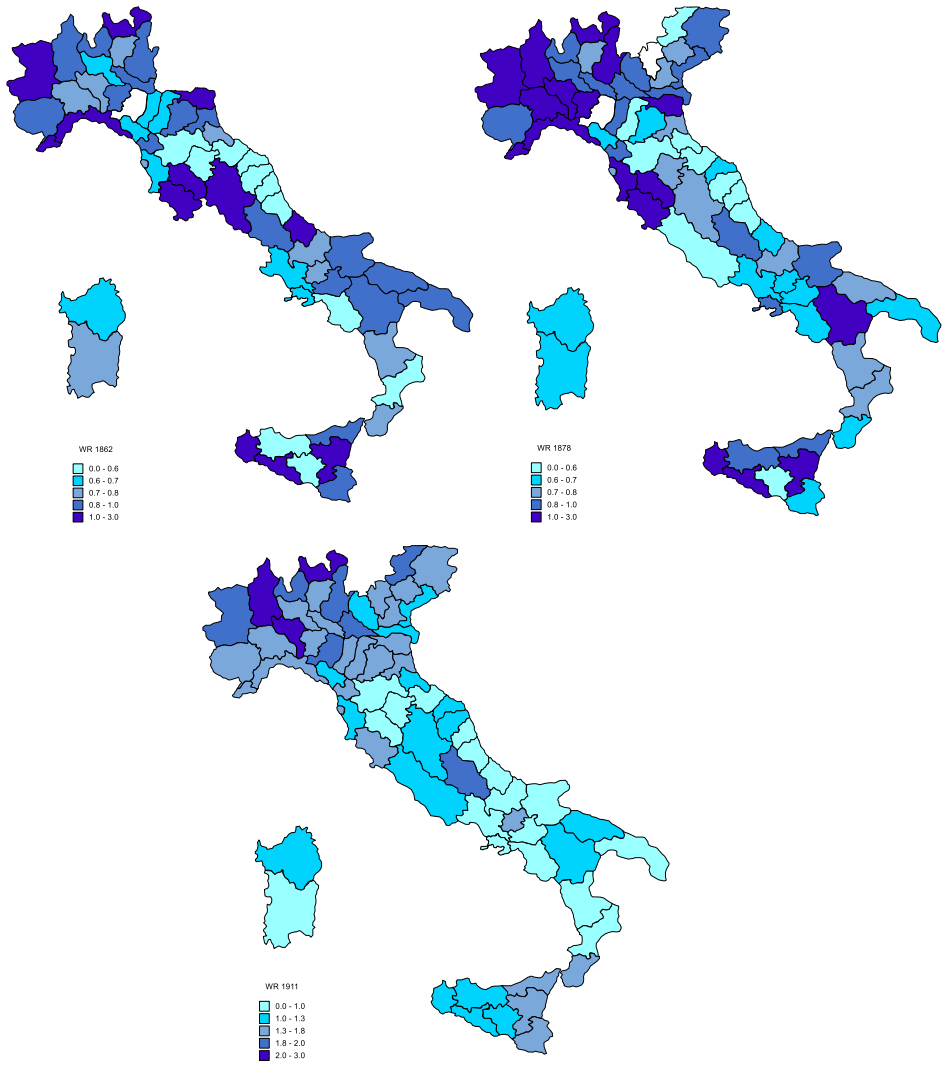
Figure 3. Regional welfare ratio for unskilled workers



As expected, both sets of data show sizeable differences within macro-areas. For instance, the increase in WR from 1905 to 1913 was much more impressive in Sicilia (+ 69 per cent) than in Sardegna (+ 17 per cent), while the overall modest growth in the Continental South was determined by wide and largely uncorrelated fluctuations. In the North-West, the ratios grew fairly steadily in Piemonte and Lombardia, while in Liguria they remained broadly constant (at a rather high level for Italian standards) in the 1860s and 1870s and boomed in pre-war years. In the long run, the dispersion of regional ratios declined by a couple of points, from 0.212 in 1870-1878 to 0.194 in 1905-1913. Interestingly, the coefficient of variation was stable and very similar also in Austria-Hungary (0.195 in 1870-1878 and 0.198 in 1905-10).

The provincial maps (Figure 4) show that divergences within regions were still quite large in the 1860s and 1870s.

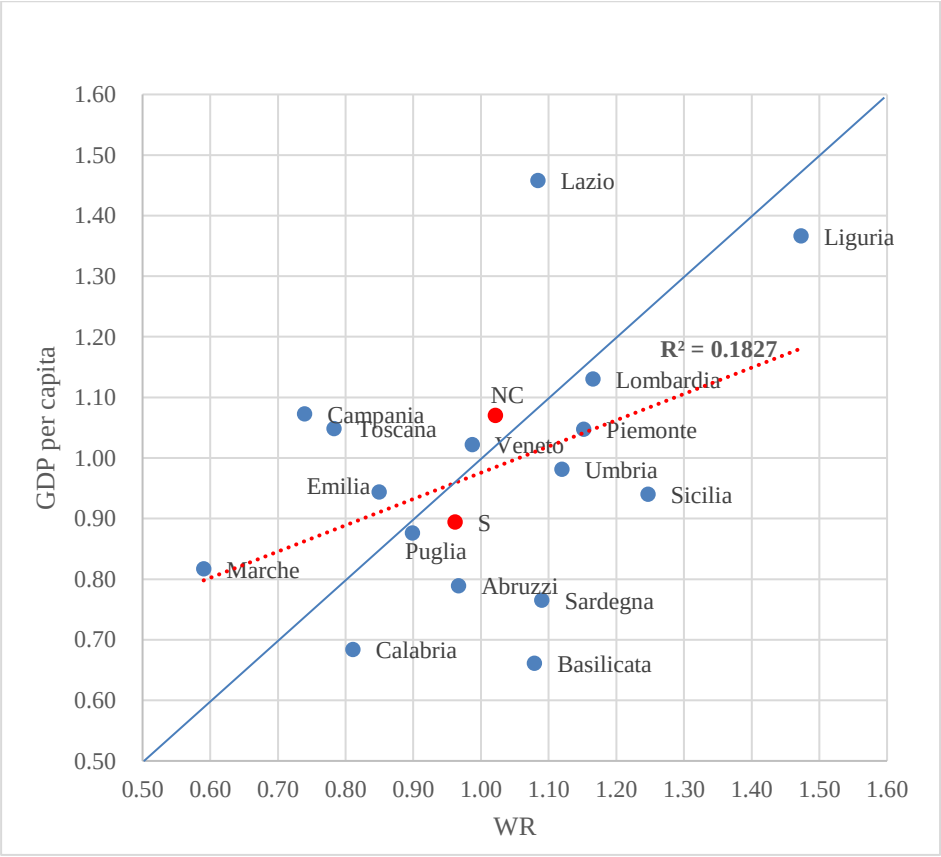
Figure 4. Provincial welfare ratios, benchmark years



Most North-West provinces show comparatively high ratios, but many other provinces, scattered all over the countries with the same high levels of WR dispersed along the entire country. The map for 1911 shows an impressive process of convergence[18]. In 1911, there is a clear North-South gradient and the provinces with (relatively) high ratios are disseminated all over the North.

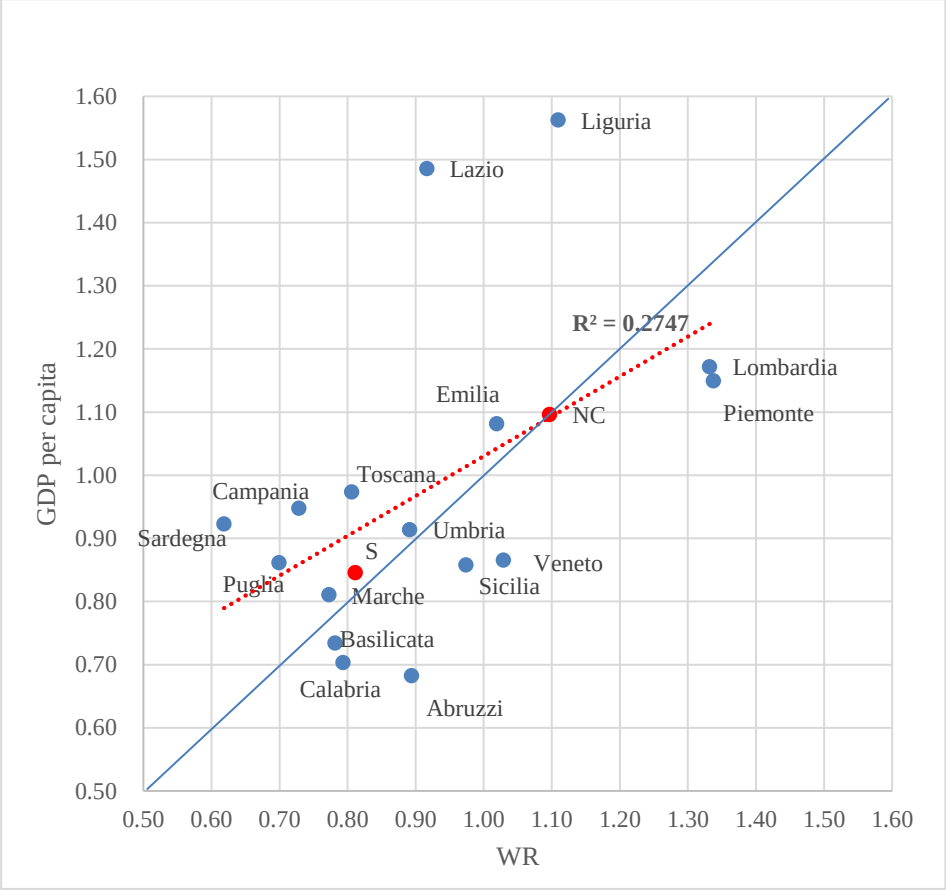
The discussion so far has focused on real wages as proxy for the standard of living of the poor, but as hinted in the introduction, they are often used as proxy for GDP. The two estimates, if measured error-free, differ mostly for the distribution of income, and thus, in theory, a comparison between them should give information about differences in regional income inequality. Thus, Figure 5 plots regional GDP per capita and wages in 1871 and 1911 (unfortunately we cannot add 1891 for lack of data), indexed to the average value of Italy =1, adding two points for Centre-North and South to compare with the estimates by Amendola, Brandolini and Vecchi (2011).

Figure 5a. GDP per capita and Welfare Ratio in 1871



[18] We are using a different set of thresholds because otherwise the 1911 figure would appear too uniform.

Figure 5b. GDP per capita and Welfare Ratio in 1911



Sources: our elaboration from our data for WR and from Felice (2014) for GDP.

If the share of labour on income relative to the Italian average was the same in all regions, one would expect coefficients to align along the 45 per cent line. This is clearly not the case, and thus one can tentatively infer that income distribution differed across regions especially in 1871, as the R^2 value shows. A visual inspection shows some regularities, with few notable changes. In 1871, there are five regions close to the 45 per cent line, seven regions significantly below the line, suggesting a more equitable distribution of income relative to the Italian average, and four above it. In 1911, only Liguria and Sardegna change substantially their position relative to the line. Reassuringly, the changes by Centre-North and South are broadly consistent with the results by Amendola et al (2011). They find that in that period inequality declined in the Centre-North and increased in the South. Of course, all these inferences are speculative given the underlying fragility of the 1871 GDP estimates.

6. Conclusions

In this paper, we estimate, for the first time, real wages in Italy at provincial level from the Unification to WWI by using the internationally comparable method by Allen (2001). We can sum up our results in three main points:

i) in the Liberal age Italy was very poor in comparative perspective: the modest growth of real wages since the 1880s was barely sufficient to converge with other peripheral countries, while the gap with North-Western Europe continued to widen until the War. The all-period peak, just before the War (1.39 or 1.75 for the North-West), correspond to 20-25 per cent of the British real wages in the same period.

ii) consistently with the conventional wisdom, the South, with the notable exception of Sicily, was poorer than the North at the Unification and the gap with the industrializing North-West went on growing until the beginning of the XX century. We interpret the increase in real wages in the pre-war years in the other macro-areas, most notably the Islands as a consequence of migration.

iii) the long-run increase in WR reflected mainly the growth of nominal wages, which was dampened by growth of prices in the 1860s and 1870s and again since the mid-1890s. In contrast, the decline in world (mostly cereal) prices accounted for most of the small improvements in the 1880s and early 1890s.

We deem that our regional and provincial wages data can be a fruitful approach to measurement of the Italian regional divide during the Liberal age and thus a useful step to understand its causes.

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Appendix

Wages

The two main sources used in this paper for nominal wages are MAIC-DGS (n.d.) for the period 1862-1878 and MAIC (*ad annum*) for the 1905-1913 period. For the former case, we have collected, for all Italian provinces, but Parma up to 1873, the hourly wages of *terraiolo*, an unskilled worker in the construction sector employed for digging and transporting ground (*terraioli* can possibly be regarded as roughly equivalent to the English 'navvies'). This source provides also information on the duration of the working day for each province and takes into account if the worker received food or accommodation as part of their salary. The *terraiolo*'s nominal wages MAIC-DGS (n.d.) refers to a single task and it does not change along the year.

The *Bollettino* (MAIC *ad annum*) reports data on wages in different locations within each province for *braccianti* (casual agricultural workers) and *salariati fissi* (permanent staff). We exclude these latter as money wages were only part of more complex wage packages, which included food, lodging and the right to cultivate some land, and because their tasks, such as tending cattle and monitoring, implied some additional skills. Likewise, we use wages for *braccianti* as a measure of the return to unskilled labour for sharecroppers and tenants – i.e. we assume that any additional income of these latter reflected the returns to other factors they supplied (e.g. capital and managerial skills). The *Bollettino* reports monthly wages by specific task – we have found more than one hundred different denominations, which we have collected in sixteen main tasks, plus a residual one[19]. Most of these tasks related to specific crops (e.g. picking fruit) and/or were performed in some months only, while others, such as harvesting, were physically very demanding and thus were paid more than the others. On the other hand, it seems likely that wages were equal across products for the same task in the same month. Thus, the total return to unskilled work for the j-th crop can be written as

$$W_i = \Sigma n_{ij} * A_j * w_i \qquad (1)$$

where n_{ij} is the number of days of work in the i-th task necessary to cultivate an hectare of the j-th crop with the prevailing technology, A_j is the acreage in the j-th crop and w_i the wage for the i-th task. The average daily wage for the province (or region or macro-area) would simply be the ratio of the sum of crop-specific returns to the total number of work-days

$$w^T = \Sigma W_i / \Sigma\Sigma n_{ij} * A_j \qquad (2)$$

[19] The tasks are *Lavori non qualificati* (not otherwise specified jobs), *lavori di scasso* (digging), *aratura* (workers only) (ploughing), *concimazione* (manuring), *vangatura* (spading), *zappatura* (hoeing), *potatura* (pruning), *innesti* (grafting), *semina* (sowing), *falciatura* (mowing grass), *cura della vite* (tending vines), *sarchiatura* (weeding), *mietitura* (harvesting), *trebbiatura* (threshing), *fienagione* (haymaking), *vendemmia* (harvesting grapes), *raccolta frutti* (picking fruits) and *lavori nell'orto* (gardening). We collect all minor tasks in a residual category *altro* (other). It is worth noticing that the 1913 figures refer to the first half of the year and thus are less accurate.

Unfortunately, a large number of wage-data by province/month/job is missing from the BUL and thus a simple average of the available observations would yield a biased value for w_i. As an alternative, we estimate the average wage as:

$$w^T = R^{1911} * w^O \quad (3)$$

where w^O is the wage in most common tasks (*lavori ordinari)* and R^{1911} is a region-specific ratio of total returns to wages in *lavori ordinari* in 1911. We interpret this coefficient as a sort of skill premium, which pertains to the task, rather than to the workers, as all peasants had the skill to perform any agricultural work (except grafting). We compute it for 1911 because of the coincidence in time with the population census (MAIC 1914-16) and of the publication of the data on acreage from the revamped agricultural statistics service (MAIC 1912). The use of a single coefficient R^{1911} implies that the crop mix and the technology had remained the same throughout the period. This assumption is clearly quite bold, but it can be defended by noting that these changes would affect also the demand for each task and thus the ratios between task-specific wages would include them.

As a first step, we compute yearly series of wages in *lavori ordinari* (w^O) from 1905 to 1911 by province by averaging monthly data for the three most frequent tasks, spading, hoeing and 'not otherwise specified jobs', after adjusting for seasonality.[20] Then we weight these data with the share of the province on agricultural workforce in the region from the 1911 Population Census (MAIC 1914-16) to get regional wages.

We compute the ratio R^{1911} as:

$$R^{1911} = \Sigma\Sigma\, n_{ij} * A_i * w_{ij} \,/\, \Sigma\Sigma\, n_{ij} * A_i * w_{ij}^O \quad (4)$$

Where the numerator and denominator differ only for the wage data (task-specific versus *lavori ordinari*). We consider four main crops (wheat, corn, rice and wine and olive oil), which jointly accounted for 47 per cent of the gross output of Italian agriculture (Federico 2000: Tab. 1), and the production of fodder. This latter absorbed most of the total work for cattle-raising, which accounted for an additional 12 per cent of the output: as said, milking and tending was performed by specialized permanent staff. We assume implicitly that the aggregate R^{1911} could be extended to the omitted products. We estimate regional coefficients to take into account the wide differences in technology and thus labour input and in wages across regions.

We get data on acreage (Ai) from MAIC (1912). The source reports separate figures for *vigneti specializzati* (vineyards) and *promiscui* (intercropped vines), *oliveti specializzati* and *promiscui* (same for olive trees) and for three different types of meadows: *prati naturali asciutti* (meadows), *prati irrigui* (irrigated meadows) and *prati a vicenda and erbai* (rotation

[20] As many observations are missing, we obtain our monthly data for *lavori ordinari* as average of the three tasks. However, considering that we do not always have information for all months for all provinces, we have estimated an index of seasonality at macro-area level. Indeed, it is worth noticing that there are great difference in agricultural wages in different seasons: summer and spring wages are higher than those for autumn and winter. Thus, we have constructed an index, for each macro-area, by estimating the ratio between the average value of each month and the yearly value. When for a province we have missing values for some months, we applied the monthly index of seasonality of the macro-area.

meadows). These different categories needed different amount of labour and thus we treat them as separate products in our estimation.

We estimate the number of days nij by crop and by region, combining the estimates of total labour input by Angelini (1937) with information on the number of hours for each task from a number of technical sources, roughly adjusting for the different dates of the sources[21]. We convert Angelini's figures in number of hours into number of days by assuming a 8 hours' workday, which was the standard of the 1930s. Angelini (1937) reports separate figures by gender, while some technical sources distinguish work with animals (oxen, horses), especially for ploughing, from standard work of day labourers. In these cases, we simply sum up the number of days for different categories and we value all of them at the current daily wage for male labourer. This latter is somewhat higher than the wage for women and children and much lower than the wage for labourers with animals, which includes the return to the capital in animals. Our procedure might introduce some bias relative to the 'true' labour cost, but any bias would affect both numerator and denominator and thus probably be small and anyway within the margin of error of the exercise. We estimate the labour input for intercropped vines and olive trees by reducing the number of hours in specialized cultivation with a region-specific coefficient ratio from Angelini (1937) and the ratio of yields in 1936-1938, the earliest computable ones with the official statistics.[22] In most cases, our final estimates exceed the data from Angelini by 10-15 per cent, reflecting the labor-saving technical progress from 1911 to 1937. Again, any mistake would affect both sides of the ratio.

The work so described leaves a gap for the period 1879-1904, which we have filled by using different sources for different areas of the country. Since, as explained below, for this period we do not have information for all provinces, the estimation of the WR for each macro-area, and for the entire country, is based on the weight of the single province on the total of provinces for which we have collected data. It is worth noting that we have done some robustness checks on the potential bias due to this limited geographical coverage calculating the WR for the periods 1862-1878 and 1905-1913 by using only this limited set of provinces. Reassuringly, the series for Italy and for all areas, except Centre, are coincident with those computed by using the full sample.

[21] We use for wheat and corn Abeni (1870), Bordiga (1907), Cuppari (1870), MAIC (1905), Comizio Agrario di Bologna (1880), Muzi (1882) and Niccoli (1898); for wine Bordiga (1907), Cuppari (1870), MAIC (1905), Ottavi and Marescalchi (1898), Ottavi and Marescalchi (1907), Ottavi and Marescalchi (1909) and Rigotti (1931); for olive oil Bordiga (1907), Caruso (1885), Cuppari (1870), MAIC (1905) and for meadows Abeni (1870), Bordiga (1907), Cuppari (1870), MAIC (1905), Comizio Agrario di Bologna (1880), Muzi (1882) and Niccoli (1898). We use MAIC (1905) only for the division of total number of days among the different tasks because the total number of hours appears heavily overvalued: for instance it reports a total of 642 days of work per hectare of wheat for the province of Lecce vs. a region-wide average of 37 days according to Angelini (1937).

[22] These ratios are 0.70 Abruzzi, 0.60 Liguria and Puglia, 0.50 Piemonte, Campania and Basilicata, 0.25 Toscana, Marche, Umbria and Lazio, 0.20 Lombardia, Veneto and Emilia, and 0.15 Calabria, Sicilia and Sardegna for wine, and 0.5 in Toscana and Basilicata, 0.33 Liguria, Veneto, Abruzzi and Sicilia, 0.25 Lombardia, Marche, Umbria, Campania and Calabria, 0.1 Veneto and Sardegna for oil.

The wages series for the different macro-areas in the period 1879-1904 are calculated as follows.

North-West: we have collected agriculture yearly data of hourly wages for Mantova, Milano and Pavia from Albertario (1931) for the period 1881-1907 and for Novara from Pugliese (1908) for the period 1880-1905. Then we have compared these data, assuming that the working day was of 10 hours, with the ones constructed from MAIC (*ad annum*) for the same provinces for 1905-1907 and applied the resulting indexes of the mean of three years back to these series. Then, we have applied the regional values (Lombardia for Mantova, Milano and Pavia and Piemonte for Novara) of the overtime to these series. For the years 1879-1880 we have interpolated these series with the ones from MAIC-DGS (n.d.). Moreover, we have collected daily wages data for Genova from Felloni (1957) who provided a series of unskilled workers in constructions (*muratore manovale*) for the period 1876-1890. Since this kind of workers are slightly different from *terraiolo*, firstly we have compared the two MAIC-DGS (n.d.) series, those of *muratore manovale* and *terraiolo,* for the period 1876-1878, and then we have applied the three years average of the resulting index to the original series from Felloni (1957) for the years 1879-1890.

North East: we have collected agriculture yearly wages data for Piacenza from Parenti (1911) for the period 1880-1907. Then, we have compared this series, assuming that working days were 270 per year as calculated from MAIC-DGA (1876-79), with the one constructed from MAIC (*ad annum*) for the same province for 1905-1907 and applied the resulting indexes of the mean of three years back to this series. Considering that Piacenza (Emilia) cannot be representative of the whole North-Eastern area, we have estimated the wage's series of Verona (Veneto) by assuming that the wages differences between Piacenza and Verona remained constant along the entire period. In particular, we have calculated the indexes of Verona's wages in comparison to Piacenza's wages for two periods: 1876-1878 and 1905-1907. Then, after having calculated the average of the two periods, we have applied to Verona the resulting value starting from Piacenza's wages. Finally, we have applied the regional value (Emilia for Piacenza and Veneto for Verona) of the overtime to these series.

Centre: we have collected yearly data for daily wages for Firenze from Bandettini (1957) who provided a series of unskilled workers in constructions (*muratore manovale*) for the period 1876-1890. Since these kind of workers are slightly different from *terraiolo*, firstly we have compared the two MAIC-DGS (n.d.) series, those of *muratore manovale* and *terraiolo*, for the period 1876-1878, and then we have applied the three years average of the resulting index to the original series from Bandettini for the years 1879-1890. In order to fill the gap from 1891 to 1904, we have used data by Signorini (1906: 204), who presented wages trends, in benchmark years, in Toscana for the period 1847-1904. We applied this to the series calculated from Bandettini (1957) starting from 1891 up to 1904.

South: we have collected data for Salerno for the period 1881-1907 (Bordiga 1910). Then we have compared these data with the ones constructed from MAIC (*ad annum*) for the same province for 1905-1907 and applied the resulting indexes of the mean of three years back to these series. Then, we have applied the regional values (Campania) of the overtime to these series. For the years 1879-1880 we have interpolated these series with the ones from MAIC-DGS (n.d.). Then we have collected information on agriculture wages for all provinces of

Calabria (Catanzaro, Cosenza and Reggio Calabria) for the period 1880-1895 from Arcà (1907). Moreover, we collected data about wages in different provinces (Bari, Campobasso, Chieti, Foggia, L'Aquila, Lecce and Teramo) from *Inchiesta Jacini* (data taken from Arcari 1936) for 1881. For these latter provinces, we calculate the wages for the years 1879-1880 by a linear interpolation and for the period 1882-1904 by applying the trend of the Southern provinces computed using data for Salerno and the three provinces of Calabria. Naturally, also in this case, we have applied the regional values (Abruzzo, Calabria and Puglia) of the overtime to these series.

Islands: we have collected data for the following provinces: Caltanisetta, Catania, Girgenti, Messina, Palermo, Siracusa and Trapani from *Inchiesta Jacini* (as reported by Arcari 1936) for 1879 and from Lorenzoni (1910) for the years 1883-1885 and 1906-1907. Then we have compared these latter data with the ones constructed from *Bollettino* (MAIC *ad annum*) for the same province for 1906-1907 and applied the resulting indexes of the mean of two years back to 1883-1885. Finally, we have applied the regional value for Sicilia of the overtime to these latter values. In order to fill the gap of the period 1885-1904, we apply the trend of the Southern provinces computed using data for Salerno and the three provinces of Calabria.

Prices

Our basket includes 13 different goods, plus rent, which, following Allen (2001), we add as a fixed 5% to the cost of the basket. We have estimated provincial prices for nine products, accounting on average for about the 95 per cent of the total cost of the basket. Only the *Bollettino* (MAIC-DGS *ad annum*) reports prices for (almost) all the 69 provinces for 1874-1896, and the other main source, MAIC (1914), for 43 cities for 1895-1913 – both with few gaps. The number of markets we have been able to collect from other sources (mostly MAIC-DGS 1886) varies by product from 5 to about 25-26. In both cases, we fill gaps with the average prices of available neighbouring provinces.

1. *Bread*: prices are available for 1874-1896 from *Bollettino* (MAIC-DGS *ad annum*) and for 1896-1913 from MAIC (1914). For the period 1862-1873, we estimate bread prices from data on wheat prices on the basis of a 'bread equation', representing the relationship between bread and wheat prices in the period 1880-1896. We run the regression with prices of wheat and bread in the period 1874-1896 from *Bollettino* (MAIC-DGS ad annum) and we use the coefficients to extract bread prices from wheat prices in 25-27 cities, from MAIC-DGS (1886), Petino (1959) and Delogu (1959).
We include in the regressions year and provincial or regional dummies in order to take account idiosyncratic local factors or specific events affecting the price of bread. Our main estimates are reported in Table A1.
Our results show that the inclusion of more controls in the model, in order to capture specific local or temporal circumstances, produces a reduction of the coefficient of the wheat prices (as one would have expected).

Table A1. The 'bread equation'

	(1)	(2)	(3)
Pricewheat	0.682***	0.881***	0.485***
	(0.0872)	(0.0251)	(0.0676)
Region dummies	Yes	No	No
Province dummies	No	Yes	Yes
Year dummies	Yes	No	Yes
Constant	0.127***	0.136***	0.263***
	(0.0293)	(0.00891)	(0.0234)
Observations	1,130	1,130	1,130
R-squared	0.624	0.828	0.852

Note: the dependent variable is the price of bread. Standard errors in parenthesis.*, ** and *** indicate levels of statistical significance of 1 per cent, 5 per cent and 10 per cent.

Allen (2001) has obtained a coefficient of transformation of the price of bread in kg. versus the price of wheat in kg of 0.9317. This is consistent with his own interpretation of his bread equation as a cost function where the bread price = cost of raw inputs + wages + rental costs of capital goods (assuming perfect competition in milling and baking). In his equation, wages and rental costs of capital goods are proxied by the wage of mason (which in turn proxies the income of a baker). Our equation does not include estimates for labour and capital costs. This, plausibly, explains the lower coefficient of transformations of our models. Our choice of adopting 0.485 as coefficient of transformation is also motivated by leaving some plausible 'room' for capital and labour costs if one would like the bread equation as a cost function.

2. *Corn*: prices 1862-1873 from MAIC-DGS (1886) for 17 cities, 1874-1896 from *Bollettino* (MAIC-DGS *ad annum*) and from 1897 to 1913 from *Il Sole* (*ad annum*), the leading Italian commercial newspaper, for 13-15 cities.

3. *Beef*: prices 1862-1873 from MAIC-DGS (1886) for 5 cities, 1874-1896 from *Bollettino* (MAIC-DGS *ad annum*), second quality, and 1897-1913 from MAIC (1914).

4. *Wine*: prices of second quality for the period 1862-1873 is from MAIC-DGS (1886) for 5-7 cities, for 1874-1896 period from *Bollettino* (MAIC-DGS *ad annum*) and for 1897-1913 from MAIC (1914).

5. *Olive oil*: prices from 1862 to 1873 for 10-12 cities, from MAIC (1886), Bandettini (1957) and Petino (1959)

6. *Butter*: prices 1885-1889 from *Il Sole* (*ad annum*) for 9-12 cities, 1890-1913 from MAIC (1914). We extrapolate the 1885 prices backwards to 1862 with price of butter from ISTAT (1958).

7. *Eggs*: prices 1897-1913 from MAIC (1914), extrapolated backwards to 1862 with price of eggs from ISTAT (1958).

8. *Fava beans*: We use the nation-wide data (Istat 1958) adjusted on a regional basis with data on prices in the 1850s for Florence (Bandettini 1857), Cagliari and Sassari (Delogu 1959) and Rome (Pinchera 1957). We assume that regional differences remain constant along the period.

9. *Firewood*: 1881-1896 from Bollettino (MAIC-DGS *ad annum*), extrapolated backwards to 1862 and forward to 1913 with prices from ISTAT (1958).

We obtain nation-wide prices for other three other products (soap, candle and lamp oil) from Istat (1958, Tab. 96 and 97). We estimate the price of (five meters of) cotton cloths for 1870-1913 adjusting the price of cotton yarn from Cianci (1933) with data of length per unit of weight from Bankit-FTV dataset on Italian trade. We extrapolate the price of cotton yarns from 1870 to 1862 with the price of raw cotton in the United Kingdom from Mitchell (1988).

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