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

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ABSTRACT: The origins of the Italian North-South divide have always been controversial. We fill this gap by estimating a new data-set of real wages (Allen 2001) from the Unification (1861) to WWI. Italy was very poor throughout the period, with a modest improvement since the late 19th century. This improvement started in the North-West industrializing regions, while real wages in other macro-areas remained stagnant. The gap North-West/South widened until the end of the period. Focusing on the drivers of the different regional trends, we find that human capital formation exerted strong positive effect on the growth of real wages.

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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 a North-South gap and its evolution were 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 for 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, therefore, mainly focuses on the first decades after the Unification, when GDP data are missing or very uncertain. Welfare indicators, 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. Moreover, scholars have also discussed the factors driving the different economic performance between North and South. In the last years, this reassessment of the drivers of divergence has been revived by a series of econometric studies using both regional and provincial data.

This paper expands on this research agenda by estimating yearly series of real wages from the Unification to WWI, following the approach introduced 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 standards 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 and 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 number of bare-bone baskets that the wage could buy. 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 for 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 it is common in the literature.

Furthermore, we employ our estimated provincial real wages to provide a reassessment of the 'ultimate' causes (human capital, resource endowments, market potential, infrastructure and social capital) of the patterns of divergence between North and South using a growth regression framework.

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 contains our growth regression exercise. Section 7 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 the prospects 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 Southern development only 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. In their view, the gap was created by the harsh 'neo-colonial' policy of the Savoy-dominated Italy.[1] 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 self-styled 'neo-borbonic' political movement, which blames Unification for all the present ills of the *Mezzogiorno*. These interpretations have testable implications on the level of the North-South gap in GDP at the time of the Unification. The conventional wisdom implies it was already large and possibly centuries-old, while in Capecelatro and Carlo (1972) view it was created by Unification. Unfortunately, estimating historical series of GDP by region (or macro-areas) has proved to be particularly challenging. 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 relied almost exclusively on anecdotal evidence.

After some years of lull, the debate on the causes of the gap has re-started in the last years. Firstly, A'Hearn and Venables (2013), in a broad new economic geography framework, have suggested that the North was richer than other regions at the time of the Unification

[1] According to Capecelatro and Carlo (1972), 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.

thanks to its geographical advantages. It had more water and was more suited to the production of silk, Italy's main staple product, and that after 1890 it benefitted from protectionist policies and increasing market access. Secondly, Felice (2013) has returned to the traditional view, rephrasing it with 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, with three different measures of performance: GDP per capita by region, from Brunetti, Felice and Vecchi (2011), share of industrial occupation from population censuses, and labor productivity in manufacturing by province, from Ciccarelli and Fenoaltea (2013). Felice (2012) uses the former to argue that the growing North-South divergence before WWI depended on differences in endowment of human capital. This hypothesis is supported by the results presented by Cappelli (2016) and Cappelli and Vasta (2017) 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. Other works have stressed the role of geographical factors and especially of market potential. Missiaia (2016) finds some evidence for a positive role of domestic market access for the development of the North, which were however compensated by better access to world market for the South. Daniele, Malanima and Ostuni (2016) confirm the positive effect of market access on the share of industrial occupation by province for benchmark years from 1911 to present, but in their estimates the North had greater domestic and foreign market potential than the South. All studies on the causes of productivity growth in manufacturing single out human capital as a key driver, but they disagree on the role of other determinants. Cappelli (2017) and Nuvolari and Vasta (2017) find evidence of a positive role of innovative activity, measured by patent data, while Ciccarelli and Fachin (2016) identify social capital as a major cause. However, this latter result is not confirmed by

Cappelli (2017) using different measures of social capital. Other variables, such as infrastructures, water resources and market access, come out to be not significant.

This quantitative turn is undoubtedly a major leap forward in our knowledge, but it rests on somewhat weak data. The regional GDP has been estimated by allocating the nationwide total from Rey (1992 and 2000; later modified by Baffigi (2013)) for 1891, 1911, 1938 and 1951. The data for 1891 and 1911 have been estimated by Felice (2005), combining the regional on gross agricultural output by Federico (1992 and 2000) and his own estimates for other sectors. Federico has divided nationwide Value Added by sector according to occupation from population censuses, adjusting for the egregious overvaluation of female industrial employment in some early censuses and for different productivity by region with data on regional wages, broadly following the Geary and Stark (2002). In a later work, Felice (2009) used the same method to estimate GDP in 1871, 1938 and 1951. He produced his own estimates of agricultural output, relying on the official agricultural statistics (MAIC-DGA 1876-1879), which suffer from heavy overvaluation of cereal output in Campania (Federico 1982), and used the wages data by Young (1875), which refer to a restricted number of firms and mining establishments in few regions. Indeed, his estimates are still controversial, as shown by the recent debate between Felice (2014) and Daniele and Malanima (2014a, 2014b). We report all the available estimates of per capita GDP in Table 1.[2] They suggests three main issues: *i*) without a reliable 1861 estimate, it is impossible to know whether the 1860s featured a deterioration of the relative living standards 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] We reproduce here the latest version of estimates by Daniele and Malanima (2007, 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 per cent and 10 per cent) 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 about here>>

Ciccarelli and Fenoaltea (2013) estimate provincial manufacturing Value Added by allocating the regional (for about 60 per cent of Value Added in 1911) or national (for the remaining 40 per cent) Value Added by sector according to the share of the province on national or regional male workforce. This method implies the gender ratio and the Value Added per male worker to have been equal across provinces of the same region or, for about 40 per cent of Value Added in 1911, across all Italian regions.

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 2017), life expectancy and HDI (Felice and Vasta 2015). Moreover, the strikingly large and persistent differences in literacy rates are particularly relevant given the key role of human capital for economic growth. These data would support the traditional thesis about the causes of North-South divide, but they are surely not sufficient evidence, as the correlation between GDP per capita and social indicators is far from perfect. On the other hand, labor productivity in industry is not sufficiently evidence either, as industry accounted only for a fifth of Italian GDP in 1891 and 1911 (Rey 2002: Tabb. 2 and 3).

<<Table 2 about here>>

As said in the introduction, real wages are the most widely used proxy for GDP in the international literature but we do not have regional series for the whole 'liberal' period, from the Unification to WWI. Until quite recently, all series, starting with the pioneering work by Geisser and Magrini (1904), referred 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 for the whole country and the whole period. However, very recently, Malanima (2017) has estimated series of real wages by province in the 1860s and 1870s.[3] He deflates nominal wages for different categories of construction workers from MAIC-DGS (nd) with a fixed basket of goods. Consistently with his overall view, he finds no evidence of North-South gap for all workers immediately after the Unification. If any, wages were higher in the South (including islands) than in the North-Centre, although the difference was within the margin of error of the estimates. Wages of the North-Centre rose relative to Southern wages since the late 1860s, an harbinger of the future divergence. Malanima does not extend his series beyond 1878, and thus the present paper is the first systematic attempt to deal with trends in provincial wages all along the first phase of Italian industrialization

3. Sources and methods

Allen (2001) defines the Welfare Ratio (WR) as:

$$WR = \frac{W*N}{\sum_{j=1}^{K} P_j * Q_j} * \frac{1}{D} \quad (1)$$

Where W = daily wage for male worker, N 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.

Allen (2001) suggested to use two sets of WR, corresponding respectively to a 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

[3] Malanima (2013a and 2015) has also published series of real wages for Milano, Vercelli and Napoli before the Unification.

of 3.15 baskets per household. These coefficients have afterwards become an international standard, with very few 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 comparability with the international literature.

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:

$$WR\ macro-area = \sum_{i=1}^{M} \omega^i \frac{W^i * N^i}{\sum_{j=1}^{K} P_j^i * Q_j^i} * \frac{1}{D} \quad (2)$$

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).[5] The provincial data range from a minimum of 192 working days (Cagliari) to more than 300 in few provinces, but the national average, simple (251.3) and weighted by population (253.3), is actually very close to Allen's standard of 250 days of work per year. Furthermore, these differences would not matter substantially for the annual income, since the correlation between the two versions of annual income (with Allen standard and with province specific data of working days) is 0.925.

In order to have more reliable estimates of the different areas of the country, we have taken into account that the traditional Italian diet differed substantially across regions (Betri

[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 provincial number of working days was obtained by making simple averages of the number of working days for the different locations reported by MAIC-DG (1876-79).

1998, Teti 1998). 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 about here>>

We estimate daily wages (W^i) 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 the Appendix. 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 with information about the composition of agricultural gross output and the number of days worked for each product given the prevailing technology.[6] Our estimates for the period 1879-1904 ought to be considered more tentative, because we have been able to find suitable wage data only 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 by computing a new wage series for this 27 provinces in 1862-1878 and 1905-1913 and comparing it with our baseline series (with all 69 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, of high correlation in the North-East and somewhat lower but still good correlation in the Centre.[7]

[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.

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 rather satisfactory: the nationwide gap is small and rather constant in time, and also the regional ratios do not differ much from 1, with the exceptions of the Islands in 1870, that we will address in Section 5, and of the North-West in 1906. This suggests a fairly high degree of integration in the local labor markets.

<<Table 4 about here>>

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 direct observations of bread prices are lacking, we convert wheat prices into bread prices by estimating a 'bread equation' (Allen 2001):

$$Pbread_i = \alpha + \beta Pwheat_i + \sum_{i=1}^{K} y_i\, province_i + \sum_{j=1}^{T} \delta_j\, year_j \qquad (3)$$

where $Pbread_i$ is the price of bread and $Pwheat_i$ is the price of wheat in province i, and $province_i$ and $year_j$ are dummies. We estimate the bread equation with data on bread and wheat prices for the period 1880-1896 (MAIC-DGS *ad annum*) with different specifications. Our preferred one yields a coefficient of $\beta = 0.485$.

[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.

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

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, 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 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.

Summing up, we have fairly detailed and reliable data on prices for the whole period, and, in particular, for the period 1874-1896. In contrast, the data on nominal wages are complete for the initial (1862-1878) and the final (1905-1913) periods, but for the intervening period they are the result of the collation of somewhat heterogeneous sources, and, for this reason, as we have already noted, are more tentative. Furthermore, by construction, the Allen method rules out substitution among goods when relative prices change. Therefore, yearly series are bound to fluctuate widely when individual prices of major items in the basket are characterized by high volatility.

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 Italian cities traced quite well the nationwide averages.[11]

[10] For the sake of comparability with other estimates in the Figures 1a and 1b, 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.

[11] It is worth noticing how our estimates seem in line with previous contributions. For example, Malanima (2013b) shows that in 1913 wages of building workers in Northern and Central Italy were about 30 per cent of

<<Figure 1a about here>>

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).

<<Figure 1b about here>>

The Italian WR remained for most of the period the lowest of the sample and its growth since the 1890s brought it only to the same level of urban wages in Chile, Japan and China. This result may seem surprising but this low level of real wages, as well as its upward trend, is consistent with the estimates by Malanima (2017).[12] Furthermore, our findings are consistent with the available evidence on heights (Federico 2003, Peracchi 2008, A'Hearn and Vecchi 2017 and, for an international comparison, Baten and Blum 2014). On the other hand, the gap between Italy and the advanced countries was much smaller in GDP per capita than in WR and Italy's GDP was significantly higher than the Japanese and above all the Chinese one.[13] This difference in Italy's relative position in terms of GDP and WR can be accounted for by several factors such as a lower labour share, or higher labour supply per capita, or significant differences in workforce composition in terms of skills, or in the ratio between prices of wage goods and the implicit deflator of GDP (Angeles 2008). At all events, in spite of the modest improvements in the pre WWI period, Italian workers remained very poor throughout the entire period 1861-1913.

the corresponding English wages. As for skilled workers, according to Zamagni (1989, p. 119), Italian industrial real wages in 1913 were about 47 per cent of the corresponding British wages and 70 per cent of the German ones.

[12] Malanima (2017, tab. 8) estimates a daily average of 1.23 baskets per person for navvies in 1862-1878. He assumes a basket delivering 3,044 calories – i.e. 56 per cent higher than ours. Thus, his estimate correspond to 1.91 of our basket and therefore to a WR of 0.60. This figure might appear implausibly low, but one has to remember that Malanima's basket features wheat bread rather than the cheaper *polenta* (maize) – and thus it is not strictly speaking a bare-bone basket. Furthermore, rather than estimating a bread equation, he converts wheat prices into bread prices using an area-specific fixed coefficient, which assumes to be higher in the North-Centre (1.7) than in the South (1.4).

[13] 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.

5. Real wages and the Italian regional divide

Figure 2 presents our main estimates of the WR for the Italian macro areas.[14] 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 seem to be more in line with the conventional wisdom (Felice's view) than with the revisionist approach endorsed by Malanima (Daniele and Malanima 2007, Malanima 2017). 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 about here>>

From the 1880s, real wages in the North-West started to grow, most 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.[15] In contrast, in other macro areas, real wages fluctuated without any clear trend until the first years of the new century. From 1905 to 1913, welfare 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 and of the Centre need some additional comments. The very low welfare ratios in the Centre are consistent with the evidence on incomes for sharecroppers, who accounted for a large majority of the agricultural workforce, for the early 20th century.[16] Sharecroppers received incomes in kind as lodging and they had an implicit right to be subsidized in case of distress. Furthermore, market wages were reduced by the supply of labour from members of sharecropping households moonlighting for causal work. A conceptually similar argument can account for the relatively high level of WR in the Islands, which are remarkably higher than those prevailing in the continental South. In this case, as also suggested by Malanima (2017), the pattern of settlement of the agricultural workforce in very large agglomerations ('agro-towns'), typical of extensive cultivation,

[14] In this Figure, as in Table 4, we use the more accurate estimates with province-specific number of workdays.
[15] The later decline in 1912-1913 reflects a sharp rise in wine prices.
[16] The average yearly income for work unit was 251 lire in a sample of 52 Tuscan farms for 1891-1900 (Linari 1902), 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.

prevented women to seek agricultural employment.[17] These low employment rates for women made 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).

Furthermore, the series for the Islands exhibits a sharp rise of the early 1870s, exceeding in 1872 the level of the North-West. We interpret this peak as an outcome of the substantial investment in public works, and especially in railways. Lines were first opened in Sardegna and the Sicilian network was greatly expanded, so that the ratio of new lines per population in the Islands was the highest in Italy in 1868-1873 (Table 5). This caused the market for construction workers to be very tight (Malanima 2017). The figure in the Table corresponds to about a kilometre of new railways built every 9,200 inhabitants in the islands, versus 22,600 in the whole country (and 133,000 in the North-East). This can account also for the 17 per cent gap between construction and agricultural wages in 1870 in the Islands (Table 4).

<<Table 5 around here>>

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 WR by province in 1862, 1871 (the first year in which Italy had the 1911 borders) and 1911 (Figure 4).[18]

<<Figure 3 about here>>

[17] The share of population living in municipalities over 10,000 inhabitants was 72.9 per cent in Sicilia and only 38.9 per cent in the rest of the Kingdom (MAIC 1914-16). The concentration in agro-towns increased the distance between fields and houses so that workers had to cover long distances and spend several days in a row in the fields.

[18] 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.

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 underlying provincial WR. In the North-West, welfare 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 coefficient of variation of regional welfare 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) (Cvrcek 2013).

The provincial maps (Figure 4) show that divergences within regions were still quite significant in the 1860s and 1870s.[19] Most North-West provinces show comparatively high welfare ratios, but several other provinces, scattered all over the country, present also relatively high levels of WR. In 1911, there is, instead, a clear North-South gradient and the provinces with (relatively) high welfare ratios are disseminated, exclusively, all over the North.

<<Figure 4 about here>>

Table 6 shows the historical evolution of sigma-convergence (measured using population weighted coefficient of variations) by macro-areas. Interestingly enough, we find sigma-convergence in all macro-areas of the Centre and of the North and divergence in the South and in the Islands.

<<Table 6 about here>>

So far we have focused on WR as proxy for the standard of living of the poor but, as hinted in the introduction, real wages are often used also as proxy for GDP. Figure 5 plots regional GDP per capita and real wages in 1871 and 1911, indexed to the average value of Italy =1. If real wages were a perfect proxy for GDP, all points would be aligned along the 45

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

degrees line. This is clearly not the case, but a visual inspection shows some regularities, with few notable changes. In 1871, there are seven regions significantly below the 45 degrees line, four above it and five regions very close to the line. In 1911, only Liguria and Sardegna change substantially their position.

<<Figure 5a and 5b about here>>

As mentioned in the previous Section, GDP and real wages can differ for a number of factors relating to income distribution, characteristics of labour supply and relative prices. A comprehensive analysis of the relative contribution of these factors is beyond the scope of this paper. However, we can provide a rough and ready glimpse on the role of income distribution by comparing our estimates with the estimates of Gini coefficients for the Centre-North and the South by Amendola, Brandolini and Vecchi (2011). The relative position of our WR estimates for these two areas (red dots in Figures 5a and 5b) and their movements over time are broadly consistent with the results by Amendola, Brandolini and Vecchi (2011, fig. 7.9). Indeed, they find that in 1871 income distribution was more unequal in the North-Centre than in the South, and that, over time up to 1911, inequality declined in the North-Centre and increased in the South. Needless to say, all inferences for 1871 are speculative given the underlying fragility of the GDP estimate in that year (Section 2).

Finally, along these lines, we compare (Figures 6a and 6b constructed using histograms with Italy=100) for 1871 and 1911 our WR with HDI, as a broader measure of living standards (Felice and Vasta 2015), including also GDP per capita for sake of completeness. Overall, both in 1871 and 1911, there is a broad correlation between HDI and WR with the two, already discussed, major exceptions the high wages in the Islands in 1871 and the relatively low wages in 1911 in the Centre.

<<Figures 6a and 6b about here>>

6. Changes in WR: proximate and ultimate causes

We start our analysis of the growth in WR, by decomposing the overall change in terms of changes between prices and wages. In Table 7, we report the average annual growth rates of WR as the difference between the annual growth of nominal wages and the annual

growth of nominal prices.[20] Figures in bold indicate the prevailing determinant in each macro-areas for three different sub-periods. The results highlight a substantial difference between periods. Over the whole period, and especially during the Giolittian boom (1895-1913), 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 for the period 1862-1880, with the notable exception of the North-East. In contrast, in 1880-1895, WR rose mostly thanks to the decline in world prices of cereals, which cut the cost of the bare-bone basket in spite of the protection on wheat.

<<Table 7 about here>>

The traditional historiography has interpreted the patterns presented in Table 7 as driven by two proximate causes: industrialization in the North-West and emigrations for the rest of the country and, in particular, for the rise of wages in the South and in the Islands in the last sub-period (Taylor and Williamson 1997, Hatton and Williamson 1998). Especially, Taylor and Williamson (1997) argue that emigration was a key factor to prevent the Italian GDP from further diverging from the European core in the pre WWI period.

However, the literature survey presented in Section 2 has highlighted five major possible 'ultimate' drivers of the growth of real wages: human capital, resource endowment, market potential, infrastructure and social capital. Here, we provide an appraisal of the relative strength of these factors by using a simple growth regression framework, which allows us also to assess possible trends of convergence as a result of growing integration of labour markets. Ideally, one should have adopted a panel dynamic approach in order to have more precise estimates and to limit possible concerns about endogeneity (Durlauf, Johnson and Temple 2005). Unfortunately, we are constrained to use a long run specification with co-variates for the initial year (1871), because we lack a full provincial coverage of real wages observations from 1879 to 1904. Accordingly, we estimate the following equation using a provincial cross-section:

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

$$\widehat{WR}_{1871-1911} = \text{a} + \text{b} * \ln(WR_{1871}) + c * \ln(Literacy_{1871}) + d * \ln(SocCap_{1871}) + e * \ln(MktPot_{1871}) + f * \ln(Rail_{1871}) + g * \ln(Water) + \varepsilon \quad (4)$$

where, $\widehat{WR}_{1871-1911}$ is the average compound of the growth rate of WR; then we use the following co-variates:

i. $Literacy_{1871}$ is our measure of human capital and it has been retrieved from MAIC (1874);

ii. $SocCap_{1871}$ is the index of 'cooperative norms' constructed by Cappelli (2017), which is computed as the average of donations per capita to *Opere Pie* (charities) and of the number of mutual aid societies per capita, both relative to the Italian average;

iii. $MktPot_{1871}$ is the measure of domestic market potential and it is taken from Missiaia (2016). She has constructed regional estimates, thus we assign the same market potential to all the provinces in the same region;

iv. $Rail_{1871}$ is the kilometers of railway per square kilometer retrieved from Ciccarelli and Groote (2017);

v. $Water$ is our measure of the natural resource endowment. In this context, the literature has mostly emphasized the role of water resources that provided some geographical areas with an enhanced 'attractiveness' for industrial activities (A'Hearn and Venables 2013). Following Nuvolari and Vasta (2017), we proxy this factor using the (yearly) flow of rivers, canals and streams in the province (measured in m3/s). The source of this variable is the website: www.acq.isprambiente.it/pluter/ (see Nuvolari and Vasta 2017 for further details).

One would plausibly expect that all these covariates exert a positive impact on the growth of WR. Consistently with the standard growth regression exercises, we include in our specification also the initial value of the real wages (WR_{1871}). The sign of this variable is undetermined a-priori: a positive sign will indicate a convergence trend, while a negative sign will indicate divergence. Table 8 reports the results of our regressions.[21] Columns (1)-(3)

[21] We have also estimated spatial autoregressive and spatial error specifications (using both a "neighbouring provinces" and distance-based version of the spatial weight matrix) finding very similar results of Table 8 in terms of size and significance of the coefficients. These results are available on request.

refer to the entire national sample, columns (4)-(6) to the Southern provinces and columns (7)-(9) to the North and the Centre.[22]

<<Table 8 about here>>

Overall, we find that the only consistently significant driver is human capital, as proxied by the literacy rate. In particular, this turns out to be significant in the national and in the North-Centre subsample but, interestingly enough, not in the South. The coefficient for literacy, in the most complete national specification (model 3), implies that if we imagine to move in 1871 from the province with lowest literacy rate (Caltanissetta = 8.3 per cent) to the province with the highest literacy rate (Torino = 57.7 per cent) this will lead to an increase of the annually growth rate of real wages of about 3.7 per cent, corresponding to a cumulated increase of 3.4 times the initial level in 1911.[23] Remarkably, the order of magnitude of this impact is similar to the effect of literacy on industrial productivity growth estimated by Cappelli (2017, p. 353) using the same kind of thought-experiment (2 per cent per annum).

Natural resources, infrastructures and social capital are not significant while domestic market potential is significant at 90 per cent or 95 per cent in some specifications, being the effect remarkably stronger in the North-Centre subsample. However, as noted above, this variable was estimated rather roughly and this may affect negatively the results.

Overall, these effects are consistent with some of the most recent contributions reviewed in Section 2. The most remarkable new result is the negative and significant coefficient across all specifications of the initial level of wages. This implied that yearly convergence rates (Table 8 bottom row) are in line with those of unskilled urban workers (from 1.8 to 2.8 per cent) and somewhat lower of those of agricultural workers (from 3.4 per cent to 4 per cent) in Spain in the same period (Roses and Sánchez-Alonso 2004). The results by sub-samples indicate a stronger convergence, in the conditional convergence regressions,

[22] We cannot compute the annual rate of growth as time trend of time series since, as said, we do not have complete yearly series for the period 1879-1904. Hence, the growth rate is compute using the initial and final observations. In a non-reported exercise, we have run the same regressions using the average of the years 1869-1873 and 1909-1913 as initial and final observations, rather than the yearly values of 1871 and 1911, obtaining substantially similar results.

[23] The movement from Caltanisetta (Sicilia) to Torino (Piemonte) implies an increase of the literacy rate of 696.18 per cent which is multiplied by 0.00534/100.

in the North-Centre than in the South. This difference is also highlighted by Figures 7 (a-c), which show partial regressions diagrams of growth rates and initial real wage conditional to literacy variable (columns 2, 5 and 8 of Table 8).

<< Figure 7 about here >>

We interpret this convergence profile as an outcome of short range domestic migration and we buttress our view with the data of Table 9.

<<Table 9 about here>>

We estimate the percentage of Italians living outside the province of birth in 1911 as the sum of people living in another province of the same macro-area (short-range migrations, columns 1-2), in another macro-area (medium and long-range migrations, columns 3-4), as registered by the 1911 Census (MAIC 1914-1916), and of people emigrated abroad (columns 7-8). It is worth noticing that mass migrations started in the 1880s, but the data before 1904 refer to gross flows only, while a substantial number of Italians returned home (and were thus counted in the 1911 census).[24] Thus, in Table 9 we compute two different measures of cumulated emigration: *i*) an 'high emigration hypothesis', which refers to gross migration for the period 1876-1911 and *ii*) a 'low emigration hypothesis', which includes only net migrations (gross less returns for the 1905-1911 period only). The former is clearly an upper bound, as it includes emigrants who had returned home before 1911 or who had died abroad, while the latter is a lower bound since it covers only a limited period of time. The Table highlights two main points: short-range migrations were considerably much greater within the North-West than within any other macro-areas, and many more Southerners moved abroad than to other provinces. One may add that about two thirds of people born in North-East, and registered as living in another macro-area, were actually living in the North-West. Moreover, in 1911 about 15 per cent of the inhabitants of the North-West were born outside the province where the Census registered them. The percentage rises to almost 20 per cent for the working-age population (15-65 years). In a nutshell, we observe a dual movement: the early development of an Italian sub-national

[24] The ratio net/gross migration in 1905-1911 ranged from 94 per cent in North-East to 65 per cent in the South, with a national wide average of 79 per cent.

labor market in the industrializing North-West (Federico 1985) with some attraction also from the neighboring macro-areas and a massive integration of the South (but also of the North-East) with the transatlantic labor market (Hatton and Williamson 1998, Gomellini and O'Grada 2013). Overall, this interpretation is consistent with the existence of sigma-convergence in the North and in the Centre and of (modest) sigma-divergence in the South and Islands (possibly due to different rates of foreign migrations across provinces in the South) as shown in Table 6.

7. *Conclusions*

In this paper, we estimate real wages in Italy at provincial level from the Unification to WWI 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 international 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 Great War. The all-period peak in WR just before the War (1.39 for Italy or 1.75 for the North-West) corresponds to only 20-25 per cent of the English real wages in the same period.

ii) at the time of the Unification, the continental South was poorer than the North, and the gap with the industrializing North-West went on growing until the beginning of the 20th century.

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 prices (mostly cereal) accounted for most of the small improvements in the 1880s and early 1890s.

Finally, we explore the drivers of the regional trends in WR using a growth regression framework. We find a general convergence trend which is particularly strong in the North and in the Centre and it is probably related with domestic migrations. Human capital formation, measured by literacy rate, have had a strong positive effect on the growth of real wages and thus, arguably, on the process of economic growth.

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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).

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

Regions	HDI			Literacy			Life expectancy			Heights		
	1871	1891	1911	1871	1891	1911	1871	1891	1911	1871	1891	1910
Piemonte	0.380	0.457	0.517	58.0	73.1	88.4	37.1	43.9	47.7	163.9	165.3	167.4
Liguria	0.346	0.436	0.514	43.8	62.7	82.1	35.7	41.6	46.7	164.5	166.1	167.8
Lombardia	0.347	0.435	0.482	56.1	69.3	85.8	33.5	41.1	42.3	164.3	165.6	167.1
Veneto	0.318	0.412	0.488	36.1	53.3	73.4	35.2	44.3	47.6	165.9	166.5	167.9
Emilia-Romagna	0.273	0.374	0.485	28.5	42.7	64.0	32.9	40.2	47.6	164.5	165.2	167.0
Toscana	0.273	0.377	0.472	34.2	46.0	65.7	31.0	41.6	48.2	164.6	165.9	167.0
Marche	0.256	0.338	0.434	21.8	31.1	46.2	34.2	41.2	48.9	163.2	163.4	164.8
Umbria	0.272	0.346	0.442	21.0	32.5	48.4	36.6	40.8	48.8	163.1	163.7	165.2
Lazio	0.264	0.398	0.486	34.9	49.3	66.5	29.1	39.6	45.2	163.0	164.8	165.2
Abruzzi	0.217	0.277	0.385	15.6	24.0	37.9	30.7	35.8	45.6	161.5	162.8	163.7
Campania	0.241	0.306	0.375	20.9	29.6	45.8	30.7	35.8	38.9	162.1	162.9	163.6
Puglia	0.215	0.286	0.364	16.6	24.9	39.2	30.7	35.8	40.3	161.9	162.9	163.4
Basilicata	0.200	0.259	0.348	12.5	18.8	32.1	30.7	35.8	42.3	159.7	161.5	161.9
Calabria	0.195	0.249	0.348	13.4	18.4	30.7	30.7	35.8	44.1	160.7	161.9	163.3
Sicilia	0.233	0.284	0.366	15.1	23.7	41.6	35.5	36.4	39.5	161.8	161.9	163.8
Sardegna	0.216	0.302	0.393	14.4	26.0	40.1	31.6	37.6	43.5	159.8	160.8	161.3
North-West	0.359	0.439	0.498	55.4	70.0	86.2	34.9	41.5	44.5	164.1	165.5	167.2
North-East	0.298	0.397	0.487	32.7	48.6	69.3	34.2	42.5	47.6	165.4	165.9	167.6
Centre	0.271	0.372	0.472	30.1	42.1	60.1	32.0	41.0	47.7	163.8	164.9	165.9
South	0.222	0.286	0.370	17.3	25.1	39.7	30.7	35.8	41.4	161.5	162.6	163.4
Islands	0.231	0.287	0.372	15.0	24.1	41.3	34.7	36.6	40.3	161.4	161.6	163.3
Italy	0.282	0.360	0.442	32.1	43.9	61.4	33.1	39.3	44.1	163.3	164.4	165.8

Sources: HDI: Felice and Vasta (2015: Tab. 1); Literacy: Population Censuses (MAIC 1874, 1914-1916). Life expectancy: Felice and Vasta (2015); Heights: A'Hearn and Vecchi (2011: Tab. 2.1).

Notes: literacy rates and life expectancy are interpolated values between 1881 and 1901 Population Censuses.

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 (2015). High maize regions: Lombardia and Veneto; maize regions of the North: Piemonte, Liguria and Emilia Romagna; maize regions of the Centre: Marche, Abruzzo and Umbria; No maize regions: Toscana, Lazio, Campania, Puglia, Basilicata, Calabria, Sardegna and Sicilia.

Table 4. Ratio between nominal wages in different sources

	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: 1870 refers to the ratio between MAIC-DGS (nd) and MAIC-DGA (1876-79); 1906 refers to the ratio between MAIC (ad annum) and MAIC (1907).

Table 5. The development of railway constructions by macro-areas (1868-1873)

	Railway extension (Kms)			Population 1871	Kms per million inhabitants (1873)	Rate of growth of WR (%)
	1868	1873	Difference 1873-1868			
North West	1,718.6	2,098.2	379.6	7,204,200	52.7	3.7
North East	885.3	919.0	33.7	4,492,254	7.5	-0.8
Centre	1,652.7	1,715.7	63.0	4,444,249	14.2	-12.9
South	1,196.3	1,547.2	350.9	7,175,311	48.9	2.5
Islands	131.0	479.8	348.8	3,220,759	108.3	23.4
Italy	5,583.9	6,759.9	1,176.0	26,536,773	44.4	2.4

Sources: Ciccarelli and Groote (2017) for railway; population from Population Census (MAIC 1874).

Table 6. Sigma-convergence of WR

	1863	1871	1911
North West	0.196	0.185	0.129
North East	0.194	0.157	0.129
Centre	0.422	0.285	0.172
South	0.207	0.171	0.218
Islands	0.266	0.220	0.254
Italy	0.302	0.289	0.257

Notes: Population weighted coefficients of variation (three years average centered on the year reported in columns).

Table 7. Decomposition of the growth of WR (1861-1913)

	1862-1880			1880-1895			1895-1913			1862-1913		
	Wages	Prices	WR	Wages	Prices	WR	Wages	Prices	WR	Wages	Prices	WR
North West	**1.92**	0.72	1.19	-0.56	**-2.18**	1.62	**2.90**	2.11	0.79	**1.54**	0.36	1.18
North East	0.72	**0.82**	-0.11	0.89	**-1.94**	2.83	**2.51**	1.52	0.99	**1.40**	0.26	1.14
Centre	**1.39**	0.81	0.58	0.14	**-0.91**	1.05	**2.89**	0.59	2.30	**1.55**	0.23	1.33
South	**1.22**	0.90	0.32	0.19	**-0.86**	1.06	**3.17**	1.99	1.18	**1.61**	0.77	0.84
Islands	**0.89**	0.51	0.39	0.35	**-0.97**	1.22	**3.02**	1.48	1.53	**1.48**	0.45	1.04
Italy	**1.30**	0.80	0.50	0.08	**-1.35**	1.43	**2.95**	1.56	1.39	**1.52**	0.44	1.09

Notes: annual yearly growth rates of nominal wages, prices and WR.

Table 8. Growth regressions of WR (1871-1911)

Variables	Italy			South			North-Centre		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln_WR_{1871}	-0.0134***	-0.0164***	-0.0169***	-0.0137***	-0.0110**	-0.0104*	-0.0131***	-0.0188***	-0.0212***
	(0.00267)	(0.00254)	(0.00285)	(0.00454)	(0.00501)	(0.00498)	(0.00289)	(0.00303)	(0.00276)
ln_$Literacy_{1871}$		0.00781***	0.00534***		0.00713	0.00451		0.00848***	0.00589**
		(0.00121)	(0.00187)		(0.00477)	(0.00571)		(0.00210)	(0.00271)
ln_$MktPot_{1871}$			0.00855*			0.00605			0.0156**
			(0.00479)			(0.00679)			(0.00744)
ln_Water			0.000142			0.000151			0.000254
			(0.000150)			(0.000172)			(0.000507)
ln_$Rail_{1871}$			-0.000151			-0.000135			-4.96e-05
			(0.000206)			(0.000284)			(0.000296)
ln_$SocCap_{1871}$			-0.000555			0.00255			-0.00587
			(0.00295)			(0.00582)			(0.00397)
Constant	0.00736***	-0.0171***	-0.0666**	0.00265*	-0.0150	-0.0468	0.0101***	-0.0195**	-0.115**
	(0.000889)	(0.00403)	(0.0303)	(0.00152)	(0.0117)	(0.0462)	(0.000868)	(0.00735)	(0.0427)
Observations	68	68	68	25	25	25	43	43	43
R-squared	0.256	0.564	0.594	0.238	0.291	0.339	0.387	0.549	0.633
Yearly β convergence	0.0192	0.0267	0.0282	0.0199	0.0145	0.0134	0.0186	0.0349	0.0471

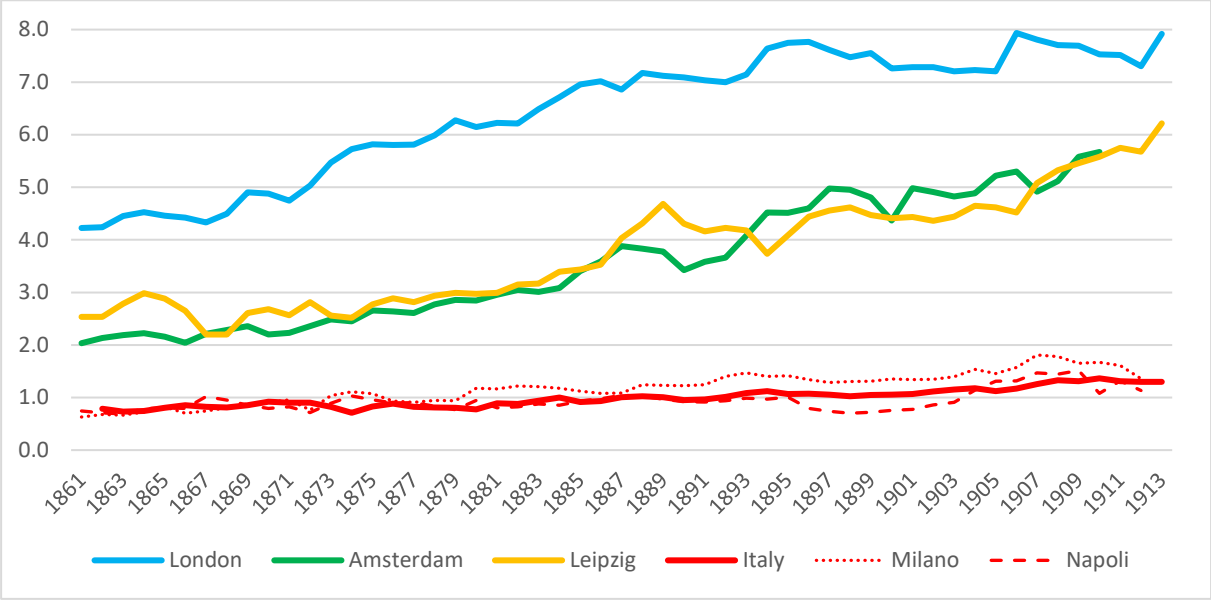
Notes: *, **, *** indicate significance levels of 10%, 5% and 1% respectively. Robust standard errors in parentheses.

Table 9. Domestic and International migrations (1876-1911)

	% living other province same macro-area (short-range migrations)		% living other macro-areas, (medium and long-range migrations)		% migrated within Italy, (short, medium and long-range migrations)		% emigrated abroad	
	high emigration hypothesis (1)	low emigration hypothesis (2)	high emigration hypothesis (3)	low emigration hypothesis (4)	high emigration hypothesis (5)	low emigration hypothesis (6)	high emigration hypothesis (7)	low emigration hypothesis (8)
North West	7.03	8.35	1.47	1.7	8.50	10.10	22.4	7.9
North East	4.09	5.55	3.19	4.3	7.28	9.88	35.4	12.3
Centre	5.47	6.10	3.33	3.7	8.81	9.82	17.6	8.1
South	3.00	3.77	2.05	2.6	5.04	6.34	27.9	9.4
Islands	2.94	3.30	1.77	2.0	4.71	5.28	19.8	10.0
Italy	4.61	5.61	2.30	2.8	6.91	8.41	25.6	9.4

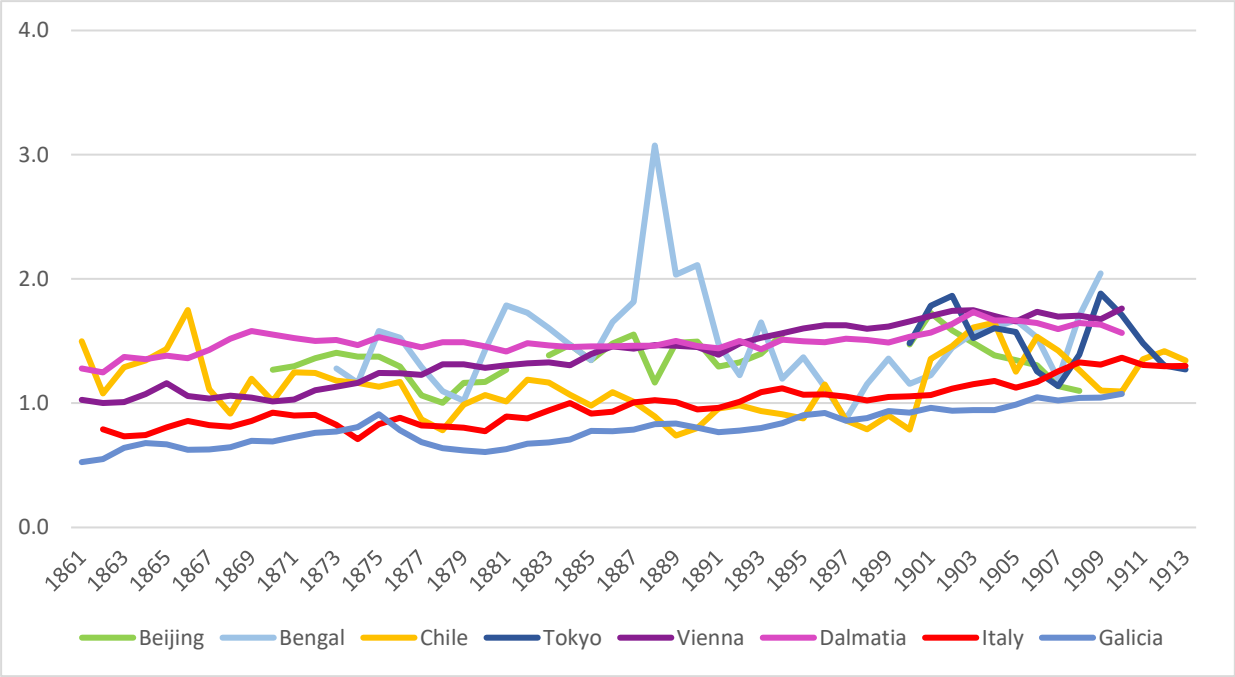
Sources: for domestic migrations: MAIC (1914-1916); for international migrations: ISTAT, *Statistiche storiche on line* (http://www.istat.it/it/prodotti/banche-dati/serie-storiche), last access July 2017.

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



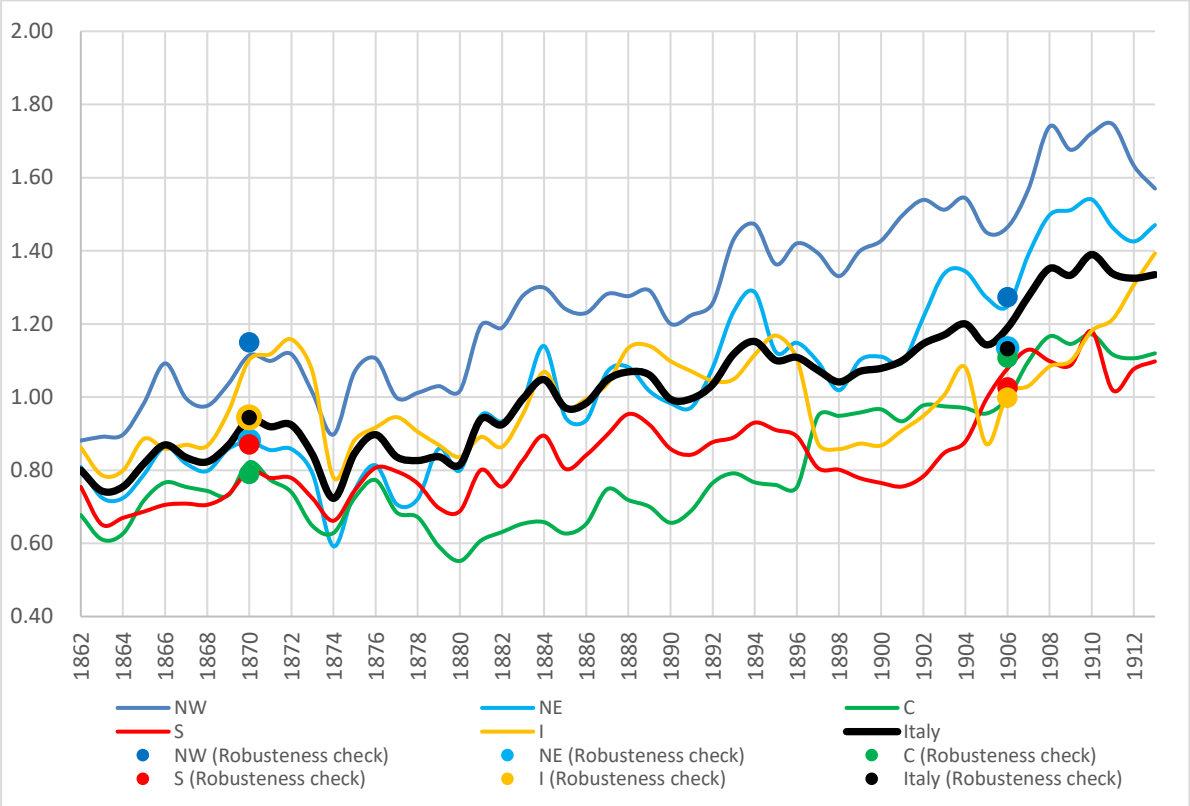
Sources: our own elaborations on data kindly provided by Robert Allen previously presented in Allen (2001) and in Allen et al (2011).
Notes: all data assume 250 working days per year.

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



Sources: our own elaborations on data underlying Allen et al (2011), Cha (2015) and Cvreck (2013).
Note: All data assume 250 working days per year. We double the WR for Dalmatia and Vienna, because the data refer to a 'respectable' basket, which should be worth twice the 'barebone' basket according to Allen method. Actually the basket for Dalmatia and Vienna is richer than Allen's 'respectable' one, and indeed Cvrcek (2013: footnote 17) warns that his estimates might be slightly undervalued.
Notes: all data assume 250 working days per year.

Figure 2. WR for unskilled workers



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

Figure 3. Regional WR for unskilled workers

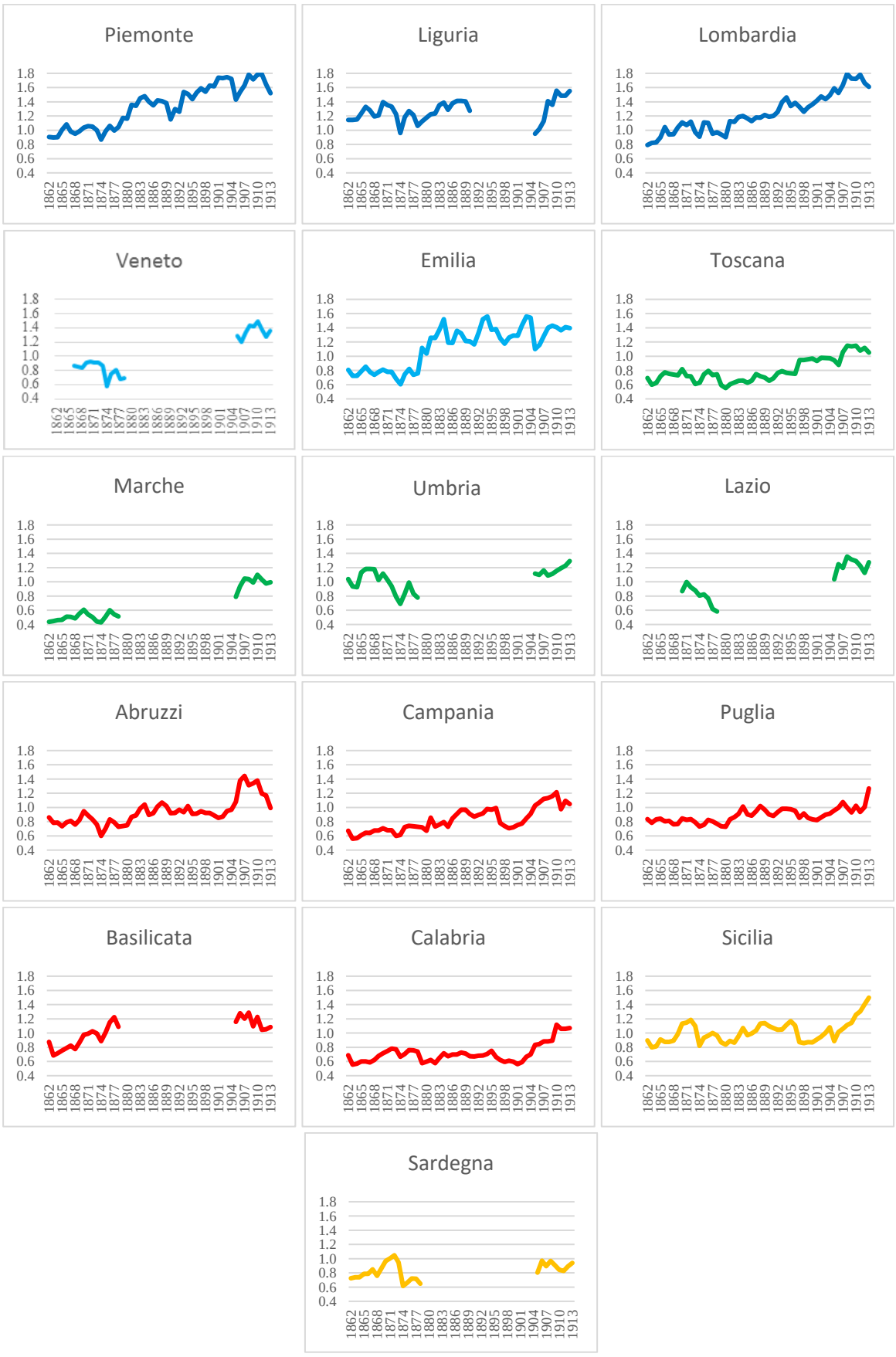
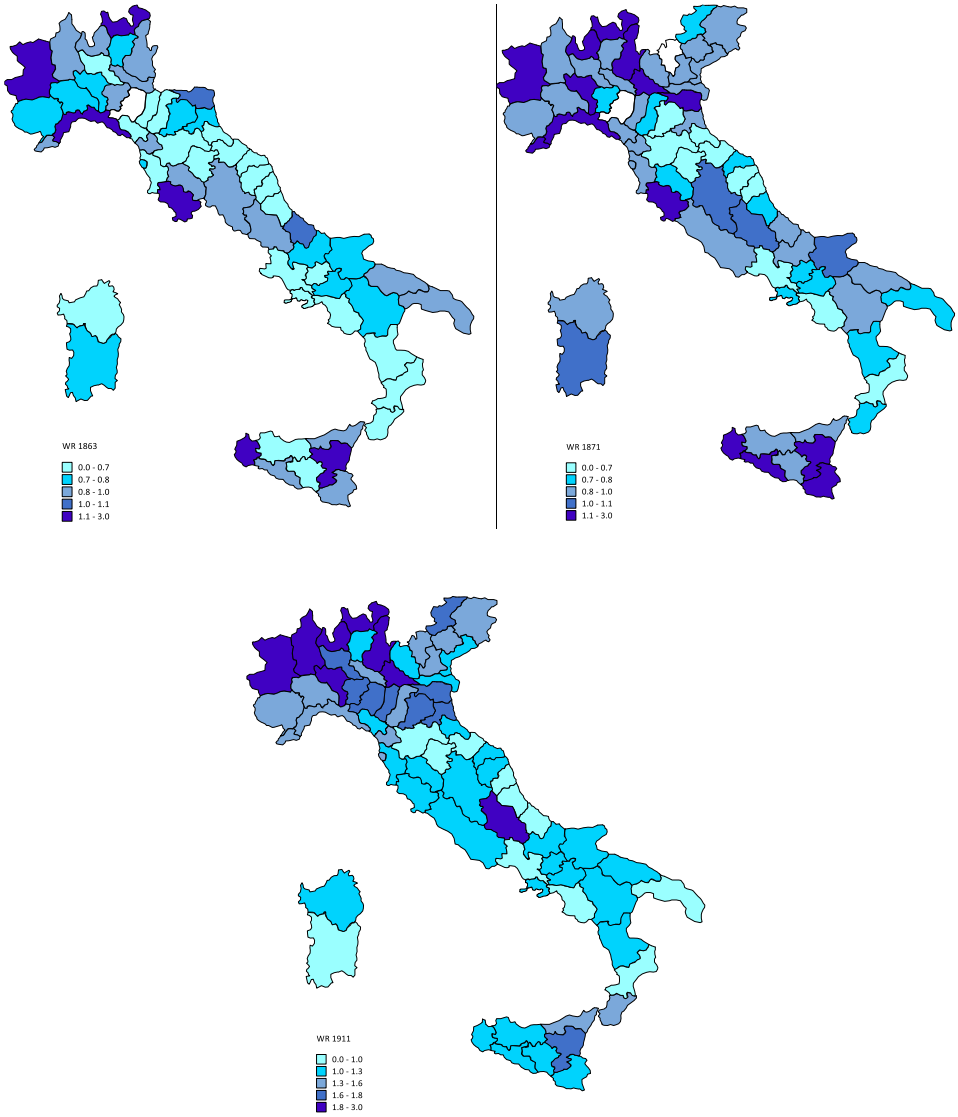


Figure 4. Provincial WR for benchmark years



Note: WR are calculated as three years average centered on the year reported in maps.

Figure 5a. GDP per capita and WR in 1871

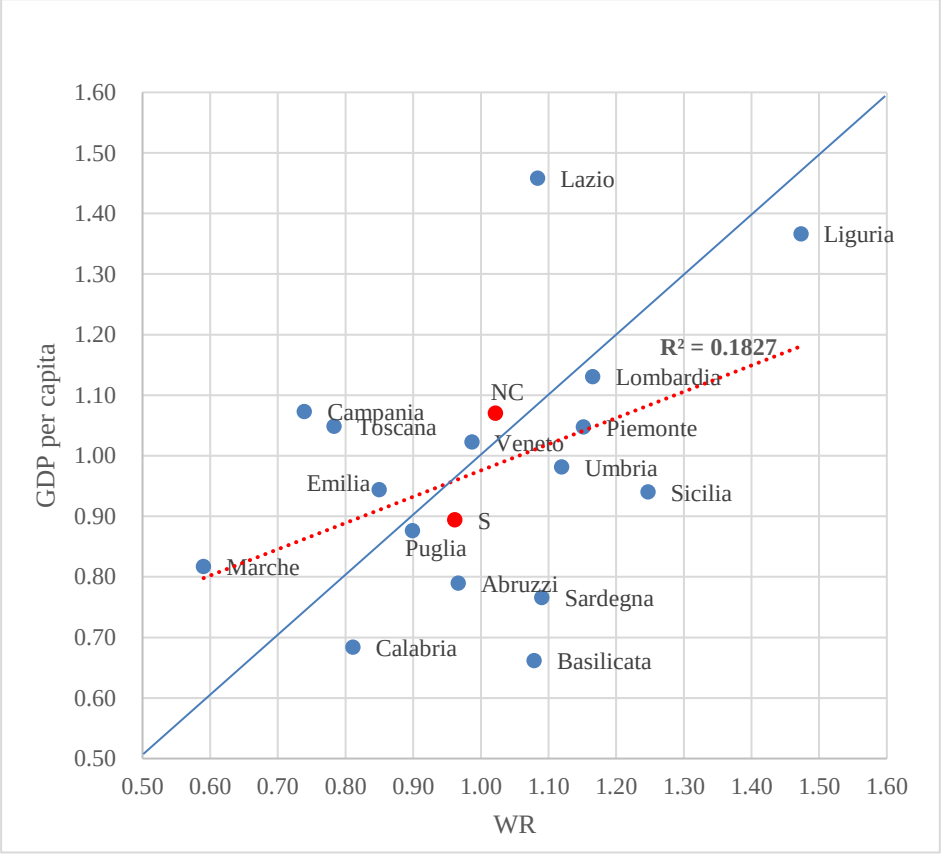
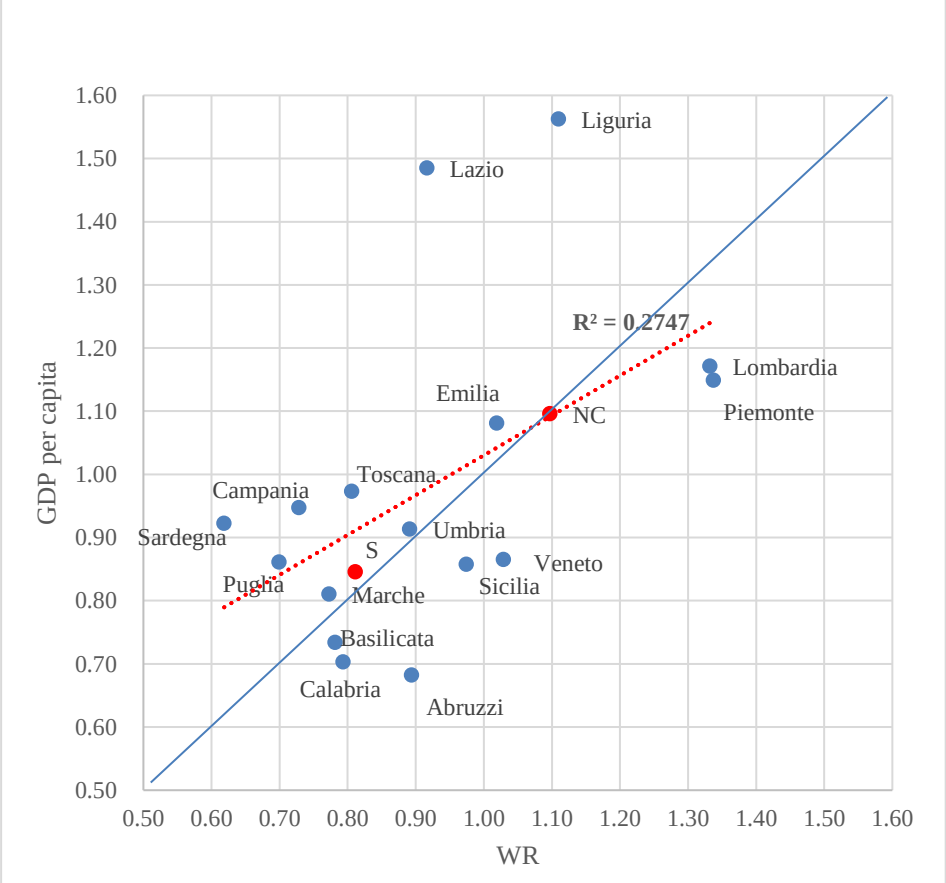


Figure 5b. GDP per capita and WR in 1911



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

Figure 6a. Macro-areas indicators, 1871 (Italy=100)

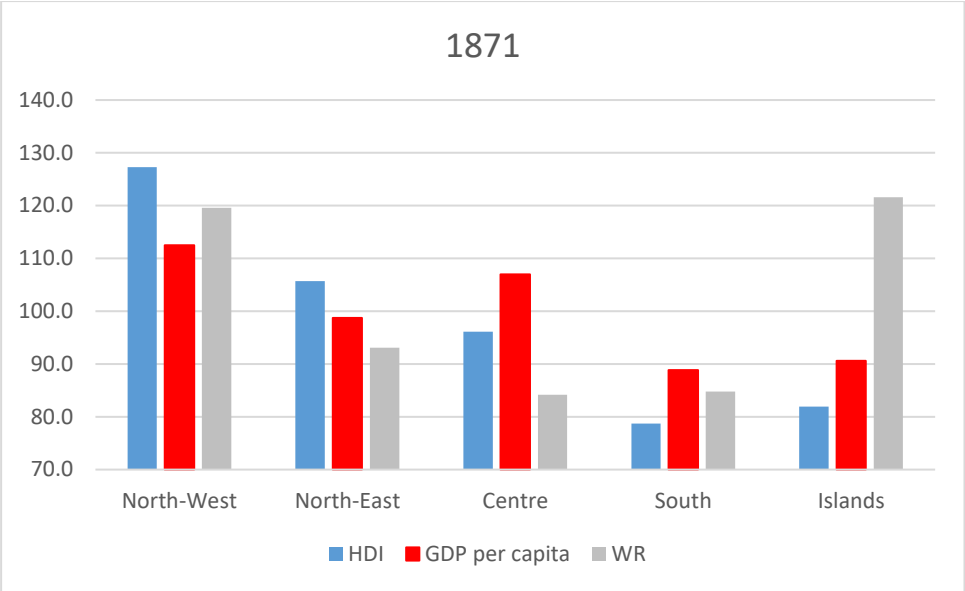
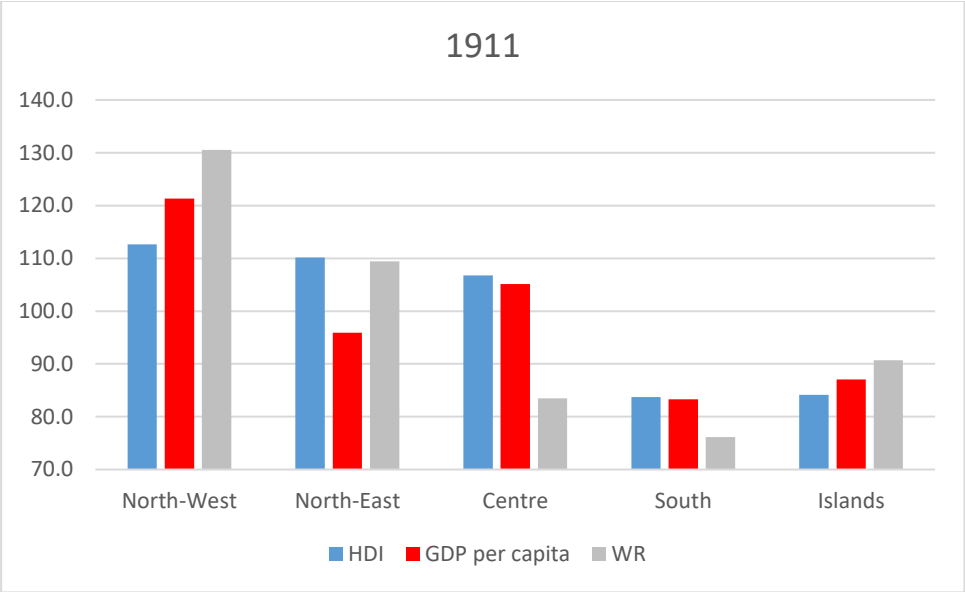


Figure 6b. Macro-areas indicators, 1911 (Italy=100)



Sources: Felice and Vasta (2015) for HDI, Felice (2014) for GDP and our own elaborations for WR.

Figure 7a. Partial regressions (overall sample)

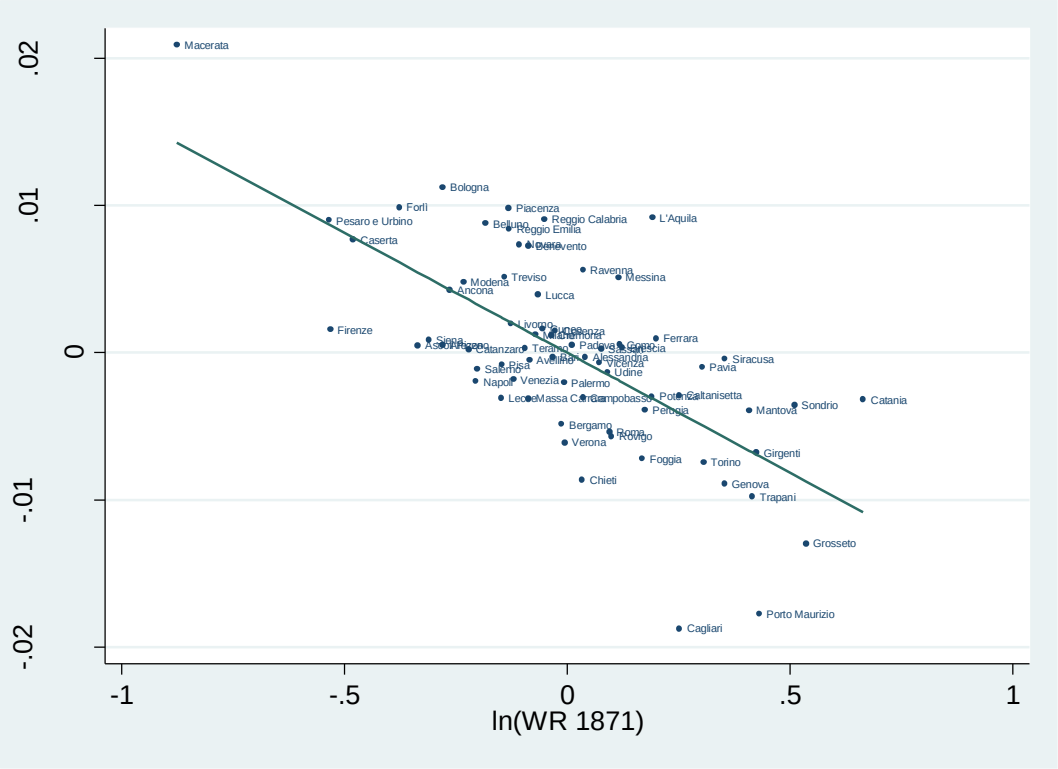


Figure 7b. Partial regression (South sample)

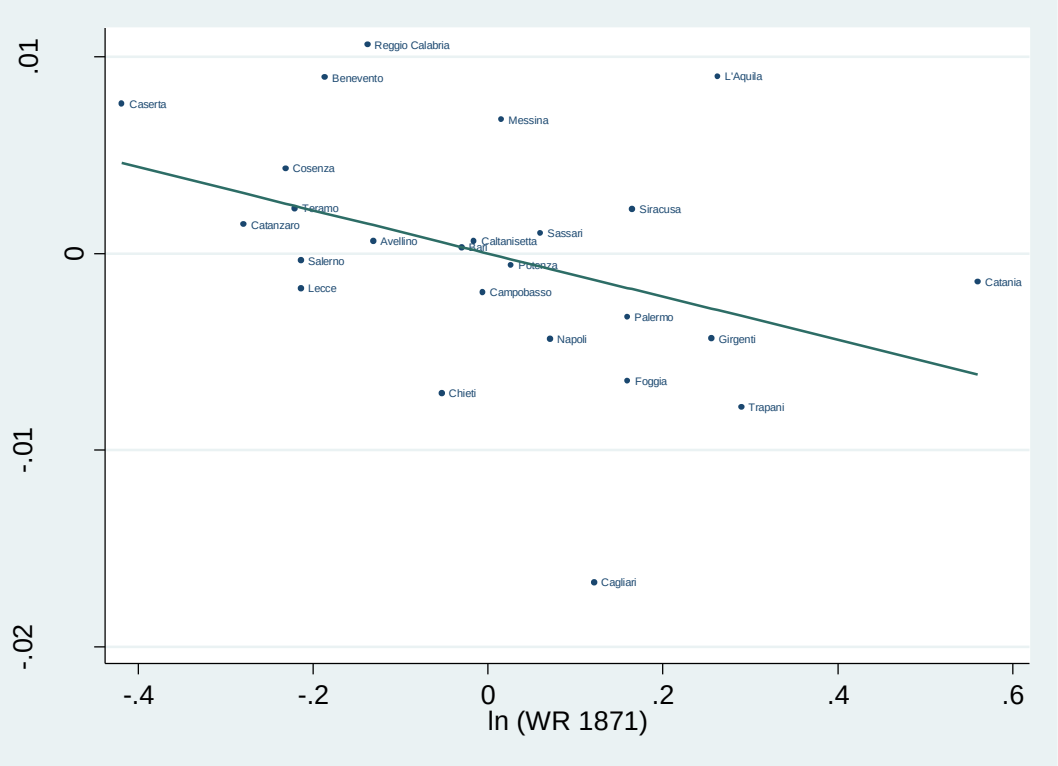
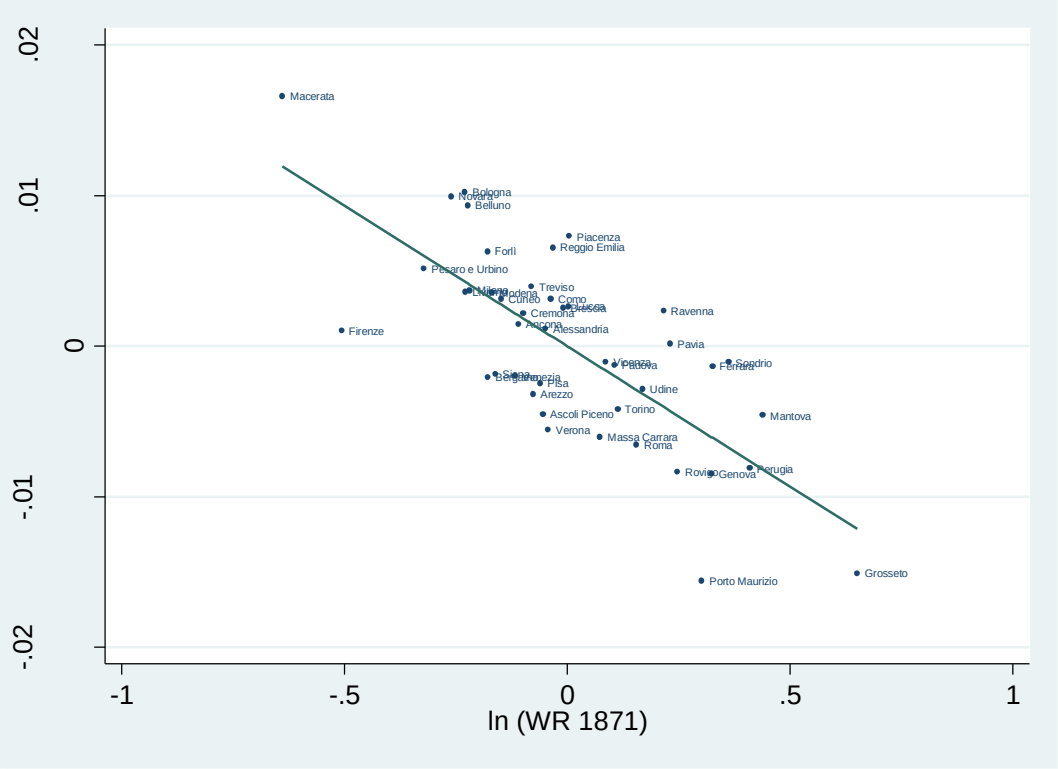


Figure 7c. Partial regression (North-Centre sample)



Notes: the figure plots the average annual growth rate of WR against the level of WR in 1871 after controlling for the literacy level in 1871.

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[25]. 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

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

[25] 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.[26] 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

[26] 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 significant differences 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 n_{ij} 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[27]. 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.[28] 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.

[27] 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).

[28] 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 "heavy tasks" 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 "heavy tasks" 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 "heavy tasks" 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 "heavy tasks" 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 "heavy tasks" 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. about here>>

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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Table A1. The 'bread equation', 1880-1896

	(1)	(2)	(3)
Price wheat	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.